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ABSTRACT

The following papers are included: "Assessment of Telecommunications Needs at the Texas Department of Health" (Adair, Griffin, Steinhausen); "Realizing the Democratic Ideal in Adult Distance Learning" (Boyd, Dirkx); "Classroom Social Interaction" (Burkhart-Kriesel); "Interaction Analysis of an Inter-University Computer Conference" (Burt, Grady, McMann); "Integrating Distance Learning Activities to Enhance Teacher Education toward the Constructivist Paradigm of Teaching and Learning" (Crotty); "Students' Perspectives of Telecourse Instruction" (Daines et al.); "Problems and Issues in Distance Learning Using Interactive Video between the U.S. and Selected African Countries" (Dooley et al.); "Understanding Students' Approach to Learning in University Traditional and Distance Education Courses" (Figueroa); "Academic Self-Concept" (Gibson); "Critical Factors in the Development of Distance Education Materials" (Gibson, Hodgkinson); "Multiple Perspectives on Implementing Inter-University Computer Conferencing" (Gunawardena et al.); "Social Presence Theory and Implications for Interaction and Communication in Telecommunications-Based Distance Education" (Gunawardena); "Investigating the Learning Process Online" (Hessmiller); "Dual-Mode Postsecondary Distance Education Support Services" (Knutson); "Study of On-campus and Off-campus Graduate Nursing Students" (Larson); "Changing Role of Moderation in Computer Mediated Conferencing" (McMann); "Issues in Professional Development in Computer Mediated Communications" (Meccouri); "Designing for Electronic Interactive Publications" (Merzdorf); "Electronic Journaling" (Pigg, Summers); "Price/Repman Model for Instructional Design for College-Level Courses Using Interactive Television" (Price); "'Nifti' Workforce Training Strategies" (Rachynski, Peterson); "Impact of an Interactive Text Book on Distance Learning Classes" (Rapp, Dodgen); "Improving Your Odds" (Smith); "Critical Analysis of Comparative Research on Distance Learning Technologies" (Smith, Dillon, Boyce); "Customer-Driven Distance Education and Its Resulting Paradigm Shift" (Stone); "Titration" (Van Vuren); "Student Perceptions of and Motives for Participation in Distance Education Using Television" (Wallace, Murk); and "Lurker Contributions" (White, Lehman). Author contact information is included. (MN)

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Distance Learning Research Conference

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Proceedings

San Antonio, Texas
April 27 - 29, 1994

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Dear Distance Education Colleagues:

It is my pleasure to welcome you to the first Distance Learning Research Conference. We hope that this conference will prove to be a productive and pleasurable experience for each of you.

Our goal for the conference was to provide you with an extensive look at current research and practice in distance education. The four–track program was designed to meet the interests of a diverse mix of researchers and practitioners working in distance education. You will have the opportunity to exchange ideas and thoughts with other professionals who are currently exploring the vast frontier of distance education. Our interaction at conferences such as this are a vital part of learning and practice in this changing world.

On behalf of the Department of Educational Human Resource Development at Texas A&M University and the Instructional Technology Transfer Center at St. Philip's College, Kelly Murphrey, Conference Coordinator, and I wish to thank all of those who gave generously to develop the conference. The national proposal referees selected a variety of provocative and well–conceived papers for presentation and discussion. On behalf of the conference committee, I thank all of the presenters for meeting demanding deadlines and for contributing their papers to the Proceedings.

Sincerely,

Karen L. Murphy

Karen L. Murphy, Ed.D.
Conference Chair

Adult/Literacy Education
Human Resource Development

Industrial/Technical Education
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Dear Colleagues,

We are pleased to present to you the proceedings of the Distance Learning Research Conference, held April 28 and 29, 1994, in San Antonio, Texas. The conference, co-hosted by the Department of Educational Human Resource Development, Texas A&M University, College Station, and by the Instructional Technology Transfer Center, Educational Support Services, St. Philip's College, San Antonio, brings together an international group of researchers and practitioners in the field.

The papers in this proceedings document present an extensive look at current research and practice—from international issues to policy and administration, from course design and instruction to learner characteristics and learner support. In an era of fast-moving technological and social change, distance education is one of the most exciting arenas in which to work, as the excellent papers which follow attest.

Enjoy the proceedings and the Conference.

Sincerely,

Lloyd J. Korhonen

Lloyd J. Korhonen, Ph.D.
Professor and Department Head

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An Assessment of Telecommunications Needs at the Texas Department of Health

SUZANNE R. ADAIR, SUSAN GRIFFIN, MARY STEINHAUSEN
Texas Department of Health

Purpose

On September 1, 1993, the Texas Department of Health Telecommunications Task Force was appointed to assess the potential for telecommunications within the Agency and to make recommendations on the application of that technology. Members of the Task Force were chosen to achieve a balance of staff representing the associateships within the Agency, including program areas and support functions. The Task Force included members with technical and nontechnical expertise in telecommunications technology.

Methodology

The Task Force was organized into three subcommittees, each charged with the task of researching available technology and department need. The responsibility of each is outlined below:

- Communications: applications to enhance communications with clients, staff, and providers.
- Data: transmission of client and program data.
- Education/Training: technology to deliver educational programs to clients, staff, and providers.

The Task Force designed and carried out an organization-wide needs assessment. Three members of the Telecommunications Task Force made presentations to programs in each associateship as well as to staff in one Public Health Region. This briefing included the distribution of a data collection instrument to be used in each program area. Programs within the associateships were asked to describe both current communication, data, and education which could be accomplished using telecommunications technology, as well as potential applications which could occur if the technology were made available. Needs of clients, staff, affiliated health departments and contractors were all included in the scope of the needs assessment. The needs assessment process and instrument were also designed to collect crude cost data, in the form of potential staff time and travel savings. Approximately 80% of the program areas at TDH collected and submitted data to the Task Force. This assessment, combined with geographic data, provided substantial data indicating a wide variety of needs and potential applications of telecommunications technology.

SAMPLE DATA

TDH PROGRAM AREA	TECHNOLOGY	INTERNAL TARGET AUDIENCE	EXTERNAL TARGET AUDIENCE	# OF PARTICIPANTS	FREQUENC OF EDUCATIONA ACTIVITY
INFECTIOUS DISEASE SURVEILLANCE & TB ELIMINATION DIVISION					
Multiply drug resistant TB training	Video teleconference	Regional staff	LHD staff	50	2 - 5x/yr
Training on contact investigation/TB skin testing	Video teleconference	"	"	20 - 50	2 - 5x/yr
Prevention of nosocomial transmission of TB	Video teleconference	"	"	100 - 150	2 - 5x/yr
Epidemiology training	Video teleconference	Regional Epi. staff	LHD Epi staff	10 - 20	3 - 4x/yr
Epi Info software training	Video teleconference and computer teleconference	"	"	20 - 50	2x/yr
TB college	Video teleconference and satellite downlink	Regional staff	LHD staff	25 - 35	3 - 4x/yr
PROFESSIONAL LICENSURE AND CERTIFICATION DIVISION					
Preceptor training	Video teleconference		Nursing facility administrators	25 - 30	3 - 4x/yr
Staff development	Video production and computer teleconference	Central office staff		No information	2x/yr
TQM training		"		"	3x/yr

Communications Subcommittee

The communications subcommittee of the Telecommunications Task Force was charged with assessing the current and potential uses for the gamut of telecommunications applications to disseminate or share information.

Uses of Telecommunications Technology for Communications

By far, the most frequent application suggested by the TDH telecommunications survey was teleconferencing (two-way audio and video) to conduct staff meetings of central office and regional or local staff. Teleconferencing, or what is sometimes referred to as videoconferencing, allows staff to communicate "face to face" in real time from distant locations. The major benefit of this technology is timely, improved communications. This technology encourages horizontal communication within the Agency (central, regions, local health departments) which is critical for continuous quality improvement and total quality management.

Twenty-eight of the 47 TDH programs surveyed positively indicated an interest in using interactive technology to enhance communication with regional staff. Public health regions also responded positively, not only to enhanced communication with central office, but also to the opportunity to network with other regions. Using this technology, central office programs which hold quarterly meetings with regional staff suggested three of the four meetings could be held using two-way interactive audio and video equipment. The consensus was that the fourth meeting of the year should continue to be held face-to-face; however, a substantial savings in travel and staff time could still be realized. Estimates provided by the VTel Corporation, a major videoconferencing equipment manufacturer, indicate that most companies recognize a 30% to 35% savings in travel costs.

Teleconferencing was also cited for use in holding meetings whose participants are both TDH employees and private or community-based partners, for example the Immunization Coalition Workgroups. In addition, it was suggested that new employee orientation for regional staff could be accomplished with teleconferencing. A wide variety of information could be conveyed effectively to providers using this

A potentially important application for teleconferencing mentioned by James Morgan, M.D., Public Health Region 1, was the use of telecommunications technology for use in medical practice. The urban/ rural disparity in health care may be partly solved by uniting technology with the art of medicine. This application allows a provider consultation to be accomplished, generally with the primary care provider requesting the consult from a subspecialist who is located at an inconvenient distance from the patient and the primary care provider's office. With a high resolution camera on one end and a television screen on the other, public health professionals could share information on patients, lab results, and x-rays. This technology could be extremely useful for public health clinics in the control of tuberculosis and sexually transmitted diseases. Texas Tech University now offers telemedicine services to physicians practicing in remote sites in West Texas. The Texas Telemedicine Project has four conferencing sites in Austin and four sites in Giddings providing medical, mental health, and educational services to that rural community.

Education Subcommittee

The charge to the education subcommittee was to research the educational uses of telecommunications technology and make recommendations on those technologies best suited to the Department's needs. The subcommittee identified both internal and external customer groups for the education that is provided by TDH. The internal customers include all TDH employees in Austin, the public health regions, and the State chest hospitals. The external customers include State participating local health departments, service providers under contract to TDH, service providers regulated by TDH, other health providers in the community, clients currently receiving services from the above mentioned providers, and the public at large.

This report will discuss both current and potential uses of telecommunications technology to meet the educational needs of our customers. To date, the subcommittee has identified the following telecommunications technologies that can be used to provide education:

- Video teleconferencing (two-way audio and video/transmitted over phone lines).
- Satellite teleconferencing (two-way audio and one-way video).
- Computer based teleconferencing (two-way audio and computer graphics).
- Telephone teleconferencing (two-way audio only).
- Video production ("real time" broadcasts or tape production for later use with one of the above technologies).
- Computer network access to educational software, bulletin boards and other conferencing systems (one- or two-way computer interaction over phone lines).

Uses of Telecommunications Technology for Education

The Commissioner's Task Force on Human Resources (March '93) strongly emphasizes the need for ongoing professional, management, and career development of TDH employees. Much of TDH's interaction with external customers focuses on training and professional continuing education. Statewide systems for training public health professionals will be critical to effectively carry out the current and future roles of public health. These efforts could be greatly enhanced through telecommunications technology.

Video Teleconferencing UTSPH Project:

Texas is one of the few states in which the state health agency is not located in the same community with a school of public health. Having the University of Texas School of Public Health (UTSPH) in Houston has made access to public health training difficult to arrange for both the individual employee and the Department. A closer, but still difficult to reach, off-site degree program was established in San Antonio a number of years ago and relies on resident core faculty, with other faculty commuting from Houston to offer courses as needed. A third off-site degree program opened in El Paso and is successfully using video teleconferencing and other techniques of distance learning for a major portion of the courses offered.

The Commissioner of Health and the Dean of the UTSPH have met and are currently selecting members of a joint committee to develop plans for an off-site degree program in Austin. The main emphasis will be on providing a Master of Public Health degree. However, individual courses could also be accessed as continuing education for those not wishing to complete a full degree program. The current goal is to offer the first course at TDH in the fall of 1994. Video teleconferencing technology is being considered, and it is anticipated that faculty from both the Houston and Austin campuses of UT will assist with teaching both distance and traditional classes. Additional benefits include interactive communications through video teleconferencing for TDH staff to tap the expertise of the faculty and for the School of Public Health students/faculty to use the expertise at TDH to assist in research and joint projects.

Other Video Teleconferencing Applications:

The Department-wide needs assessment indicates that video teleconferencing would augment or replace much of the training currently being done. Staff time and travel costs could be reduced if this technology existed in the public health regional offices and chest hospitals. The technology could be further enhanced if coupled with a computer station at each site for curriculum development/computer based training. However, TDH would need to create an infrastructure of central management, regional staff with full-time responsibility for training/coordination, and adequate technical support in order to assure this technology would be appropriately utilized.

Potential uses of this technology are:

- Continuing professional education offerings (for dietitians, laboratory staff, LVNs, RNs, MDs, etc.) for TDH staff and external customers throughout the State.

- Other program specific training for TDH staff and external customers (e.g., Immunizations, HIV/STD, Epidemiology, Zoonosis Control, Food and Drug, Consumer Health Protection, etc.)

- Employee orientation, Continuous Quality Improvement training and other management and support services training for TDH staff throughout the State.

- Presentations by special speakers (such as Ira Chasnoff and Antonia Novella) who visit and present at the central office could be "broadcast" to staff in the regional offices.

Satellite Telecommunications:

A significant amount of educational programming on health care, management, and staff development is available via satellite. Many of these educational programs offer professional continuing education (for nurses, physicians and other disciplines). Satellite dishes are increasingly affordable and TDH should strongly consider purchasing dishes for each of our major facilities throughout the State. Although facilities owned by other State agencies, universities or community colleges may be scheduled by TDH staff for satellite downlink, there is a cost involved and the agency that owns the satellite technology has scheduling priority.

Several TDH program areas have used facilities owned by other agencies to downlink programs transmitted by satellite. Other TDH program areas reported they would downlink programs if there was a coordinated system for accessing the technology "in-house."

The following external sources were identified as having appropriate programs available via satellite:

- Federal agencies, such as the Centers for Disease Control and Prevention (CDC) and the Food and Drug Administration (FDA).
- Texas Tech MEDNET.
- The Health Sciences Television Network (HSTN).
- The Public Broadcasting System (PBS).

Satellite uplink can now be obtained through external sources such as STARLINK (see the Existing Technologies section). However, the cost of totally contracting out for this technology is quite high and would only be cost-effective when a large number of participants are expected. TDH may wish to consider the feasibility of acquiring the resources necessary to perform this service "in-house." Equipment and personnel costs for satellite uplink would be similar to those required for video production.

Computer Based Teleconferencing:

Computer based teleconferencing is particularly useful for educating small groups of individuals who do not have ready access to other forms of interactive learning. It also works well for educational content that can easily be represented graphically. Scott & White Hospital uses computer based (audiographics) technology for educating emergency medical technicians (EMTs) in rural areas of Central Texas. Interactive audiographic education provided by Scott & White is augmented by self-study programs that are sent out via modem for completion at a later time.

The following TDH program areas were identified by the education subcommittee as having potential uses for this technology:

- Training by the Vital Statistics Bureau to external customers (such as hospital medical records personnel, physicians' offices, etc.) on completion of birth and death certificates.
- Training provided by TDH Emergency Medical Services (EMS) Division to EMTs throughout the State.
- Training by TDH Infectious Disease staff to public health region and local health department staff on "Epi Info" software.
- Interactive and self-study professional continuing education programs provided by TDH to health professionals in remote rural locations.

Telephone Teleconferencing:

Some areas of the Department are currently using telephone teleconferencing technology and may wish to continue to do so in the future. However, studies have shown that education is far less effective when no visual learning is involved. This problem can be somewhat alleviated by sending workbooks, handouts, etc., to participants in advance of the teleconference and then referring to these materials to provide visual cues during the session.

The education subcommittee believes that, in the future, the role of telephone teleconferencing for education will be limited. Other technologies, such as video teleconferencing, satellite downlink and computer based teleconferencing, appear to be far better suited for learning.

Video Production:

The education subcommittee has identified a number of potential uses for video production within the Department. Unfortunately, federal WIC regulations prevent the video production technology and staff expertise that is currently available in the TDH WIC Program from being utilized by other areas. Therefore, the Department may wish to explore the feasibility of obtaining additional equipment and staff to support video production "in-house."

The following are some potential uses of video production technology:

- Videotaping selected training workshops and professional continuing education offerings that are provided by TDH for later viewing by employees and external customers who were unable to attend the "live" presentation.
- Videotaping classes provided at the "off-site" UTSPH program in Austin for later viewing by TDH employees and others.
- Production of educational videos on important public health topics for distribution via the TDH Film Library.
- Possible development of uplink capabilities "in-house."

Networks, Bulletin Boards and Databases:

Computer networks, electronic bulletin boards, and databases are effective tools for both education providers and customers. However, the education subcommittee feels this technology is not currently being utilized by TDH to its full potential. There is no consistent policy or system for publicizing educational activities within TDH or to our external customers. TDH staff who provide training and professional continuing education are currently unable to access important educational resources that are available on external networks, such as INTERNET.

TDH should consider the feasibility of developing a bulletin board that would include a schedule of all training and professional continuing education provided by TDH and other relevant external training opportunities, as well. This system could be operated in much the same fashion as personnel job postings and provide computer network access to all TDH employees through the TDH Util network. External customers should be able to access this information by modem or by mail distribution of "hard copies."

TDH staff responsible for training and professional continuing education should have access to educational resources available on external networks. These individuals should also have appropriate computer hardware and software to make optimal use of available resources.

Data Subcommittee

The charge of the data subcommittee was to develop short-term and long-term recommendations related to categories, volume, and accessibility of data that support the needs of TDH and the needs specifically identified by the communications and education groups given the constraints of resources and confidentiality.

Internal Databases

The health data systems in Texas reflect the diversity of the State's population and geography. The data in these systems are vital to the development of public health priorities and policy. In Texas, the need for coordination and sharing of health data systems is particularly crucial since there are many separate State agencies that administer health and human services programs. Regional and local agencies need up-to-date data within reasonable timeframes for program planning, management, and evaluation. This report identified 167 major internal TDH surveillance systems and databases of which 80 have the potential to migrate across a WAN. There are probably many more which are yet to be identified. Many of these databases are quite extensive. For example, the Bureau of Vital Statistics registers the details of nearly 700,000 births, deaths, marriages, and divorces annually. Some of the numerous reports produced include information related to maternal and child health, chronic disease, cancer, behavioral risk factors, HIV and other sexually transmitted diseases, mortality, fertility, infectious diseases, and hospital utilization. The majority of public health workers in the field may not even realize this information exists. There is a great demand to share the information in a timely manner with those who could utilize it effectively. The subcommittee recommends a centralized database library as a means of providing access.

Some specific databases and surveillance systems in place include:

Natality Data - Detailed information is maintained by the Bureau of Vital Statistics in conjunction with the Bureau of Women and Children's Health on the more than 300,000 births that occur in Texas annually. In addition to birth outcome, birth weight, age of mother, and ethnicity, these records include data regarding prenatal care, type of birth attendant, location of birth, educational attainment of the mother, along with data regarding lifestyle risk factors.

Mortality Data - Complete statistics are maintained by the Bureau of Vital Statistics on all deaths occurring in Texas. This number exceeded 125,000 in 1990.

EPIGRAM - This computer program has made population and mortality statistics easily accessible to users. Relatively sophisticated analyses that were rarely done previously because of analytical difficulties (confidence intervals, multiple age-adjusted rates), are now carried out quickly and easily by any user. Users get immediate feedback and can carry out exploratory data analysis.

Tuberculosis Morbidity and Mortality Statistics - Data are received from all local programs and analyzed to evaluate the success of programs in achieving tuberculosis control goals and objectives.

TDH Cancer Registry - A statewide cancer incidence reporting system is maintained that currently contains data on over 700,000 cancer cases. This surveillance system incorporates collection, analysis, interpretation, and dissemination of cancer occurrence in the State. Cancer incidence trends are monitored and populations at risk identified through this registry. By maintaining this central repository of information, public health action and health care delivery systems can be assessed and effectiveness of cancer control efforts can be evaluated. The information from this registry is essential for directing efforts toward prevention and increasing further awareness and detections. According to the Cancer Control Act of 1979, the TDH is authorized to collect information on each cancer patient seeking treatment at a hospital, clinical laboratory, or cancer treatment center within the State. Currently, hospital compliance rates are approximately 98 percent. Epidemiologic analyses of reported statistics, along with numerous other data reports, are compiled and published annually for the State of Texas.

Breast and Cervical Cancer - Housed within the Bureau of Chronic Disease, this extensive surveillance database and tracking system is operating to assess the effectiveness of a statewide screening and mortality reduction program for women at or below the 200% poverty level who do not have third party reimbursement health insurance. To date, over 4,600 women have been screened through this program. This system actively gathers data concerning staging, prevalence, and incidence; as well as screening and health habits of Texas women.

AIDS - The HIV Division operates the AIDS Prevention and Surveillance Program which maintains information on the more than 16,000 Texans who have been diagnosed with AIDS since 1980, and disseminates information on the incidence of AIDS and HIV infection.

Immunization - The Bureau of Epidemiology, in conjunction with the Immunization Division, maintains statistics on the incidence of vaccine preventable diseases, as well as the distribution of vaccine to local providers.

Sexually Transmitted Diseases (STD) - The STD Control Division monitors the incidence of sexually transmitted diseases, including primary and secondary syphilis. This division maintains statewide case statistics and supports local programs in case-finding, treatment, and education.

Emergency Medical Services - The Bureau of Emergency Management collects data from 815 prehospital providers and is in the early stages of developing a hospital-based trauma data collection system. More than 1,000,000 records of data are expected to be submitted annually. These data sets will provide injury morbidity data for health surveillance, injury prevention strategies, and assessing provision of health services. Childhood injury data are incorporated for their important role in efforts to prevent chronic disability.

Behavioral Risk Factor Surveillance Survey (BRFSS) - This is a federally funded project designed to collect data on lifestyle risk factors which contribute to the major causes of illness and mortality in Texas. A random telephone survey collects information on the health practices of adult Texans (persons aged 18 years or older). Results are weighted to account for the sex, race, and age distribution in Texas.

Texas Health Promotion Clearinghouse - This is a computerized database that contains descriptions of health promotion materials and programs of national, State, and local origin.

Integrated Client Encounter System (ICES) - ICES is an integrated system currently under development that is designed to collect a variety of data for each client served by a health department. The system can potentially serve some 400 maternal and child health sites and 600+ Nutrition Services sites throughout Texas. ICES operates on a local area network (LAN) personal computer hardware system located in each clinic. Public health staff enter client and family demographic data and medical services as they are performed to create a service history which can be updated each time clients return for service. Case Workers will use portable computers to download data from the clinic computers for their clients, update files in the field as case services are performed, and then upload the updated databases back into the clinic computer system. Medical service programs include Immunizations, Community Oriented Primary Care, Child Health, Maternal Health, Dental, Family Planning, Adult Health, Case Management, STD, HIV, TB, Lab Services, and Nutrition Services. The system supports public health workers in scheduling appointments, printing forms, billing to Medicaid and third parties insurance carriers, and performing a variety of reporting that includes statistical analysis, cost analysis, and measurement of outcomes and quality of public health programs.

The ICES clinic databases (local area networks) will be linked together through the Texas Higher Education Network (THEnet) as a WAN so that data can be aggregated to the regional administrative sites and ultimately to TDH in Austin. In addition, the wide area connectivity provides the capability to transfer client data records from one clinic to another when patients move.

Potential External Databases

With the TDH connecting onto the backbone of THEnet and the expansion of INTERNET connectivity, a myriad of external databases and electronic communications options will be increasingly available to users on the WAN. The following is a partial list of the INTERNET databases that will potentially be accessible through the WAN:

- Medicaid Eligibility files on-line;
- National Heritage Insurance Company (NHIC) files;
- Geographic Information Systems;
- Access to CD-ROMs on the TDH library, Centers for Disease Control and Prevention, Environmental Protection Agency, insurance industry, medical schools, existing local health department data systems, telephone companies, and public school databases.

- Access to medical research and other on-line university library catalogs such as MedCat, TexSearch, Medline, CINAHL-CD, Grateful Med, and Loansome Doc.

Findings And Recommendations

The work of the Task Force resulted in a clearer understanding of telecommunications needs across the agency. Because the membership included staff from a variety of program areas and support functions, critical information was shared and a greater understanding of the interrelationships and coordination of this technology was achieved.

As a result of the analysis of the needs assessment, data, literature review, and existing telecommunications systems, the Task Force recommends the following:

1. An ongoing Telecommunications Committee be appointed, consisting of no more than five people who will meet regularly to review current technology initiatives, coordinate funding efforts, disseminate information, and make further equipment and technology recommendations.

2. A TDH wide workgroup be organized under the Associateship of Information Resources Management to modify and update the current survey and data collection process in order to provide a more comprehensive analysis of database and migration requirements across TDH.

3. TDH purchase C/KU band satellite dish to be located at central office. In addition, two-way video teleconferencing equipment be located at TDH in Austin, in each of the public health regional offices and in the chest hospitals.

4. The need for technical support and assistance be considered in any purchase and installation of equipment. This technical assistance may mean having a trained technician at each site, as well as having a program area responsible for providing staff and training support for the use of the technology.

5. TDH develop computer conferencing capabilities and access to internal and external bulletin boards and databases, to include, but not be limited to, INTERNET, decision-making software, educational resources, audiographics technology, etc.

6. The Existing Technologies section of this report be widely distributed across the Agency to aid the program areas in accessing that technology and in responding to RFPs which include the use of distance technology.

7. Grants and other funding be pursued for the above mentioned technology and for an infrastructure of training staff and technical support for the TDH Central Office, Public Health Regions, and Chest Hospitals. Possible federal grant sources include, but are not limited to, the National Science Foundation, the Centers for Disease Control and Prevention (Year 2000 Initiative), the Maternal/Child Block Grant, and the USDA Rural Electrification Administration.

Realizing The Democratic Ideal In Adult Distance Learning: The Participatory Developmental Education Model

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For many years, adults have utilized distance education programs as a means of addressing their particular learning goals. Until recently, these programs relied primarily on correspondence methods of instruction and remained largely within the shadow of more traditional, on-site instructional formats and methods. With the advent of satellite and other video technologies, new energy and attention has been injected into this form of adult education practice and production and dissemination of adult distance education programs have increased dramatically. Many graduate, undergraduate and certification programs are now readily available through distance learning. Governmental agencies and for-profit corporations utilize distance education for updating institutions and individuals on the latest trends in research and policy. Guided by diverse goals and manifest in many different shapes, these technologically mediated programs all offer increased access to adult education. Indeed, distance education now seems like the answer to the adult educator's ideal of lifelong learning for all.

There is reason, however, to be concerned with the influence of communication technologies on the shape of adult distance education. While energizing practice, the very ways in which these technologies are organized and structured reinforces a "banking" (Freire, 1971) approach to education. That is, learners are regarded as relatively passive recipients of needed knowledge disseminated through highly structured programs carefully designed by professionals. While promising increased access, distance learning programs often compromise another ideal of our field - that of fostering learner-centered, participatory, and democratic education. The purpose of this paper is to describe a model of adult distance education which more closely embodies the democratic ideal inherent in the tradition of adult education practice and human development. Grounded in the work of Nair and White (1987a; 1987b; White, 1993), this model utilizes the field of participatory communications to develop a view of distance learning referred to as "participatory developmental education" (PDE).

Background to the Problem

The idea of learning as empowering, emancipatory, and transformative has been consistently articulated by adult education scholars throughout this century (e.g. Lindeman, 1926; Kidd, 1959; Houle, 1961; Bergevin, 1967; Bridges, 1979; Knowles, 1980; Brookfield, 1986; Mezirow, 1991; Hart, 1992; Cervero & Wilson, 1994). Practice based on this democratic ideal stresses active involvement and participation by the learners in all phases of adult education practice. This ideal of education is manifest by adults learning through a problem-posing and problem-solving process that is reflective, critical, and contextually grounded in the adults' concrete experiences. Planning occurs from the "bottom up" and adult educators serve as resource persons to self-directed, lifelong learners.

This democratic ideal is reflected in an increasing emphasis on the importance of development as a means of addressing a number of important social issues. Development is a process of facilitating human development which aims "to offer people options, to improve their standard of well being, their political freedom, human rights and self respect" (Draper, 1989, p. 1). Engram (1993) writes, "Human development, rather than simply economic development, is the ideal strategy for stabilizing a post-Cold War world yearning for democracy.

Distance communication technologies are being increasingly used to help address these developmental goals. Framed in economic development terms, adult distance education often reduces adult learners to passive recipients in a high-tech extravaganza. Adults are often viewed as lacking certain knowledge, skills, and abilities necessary for them to effectively compete within a global community. They are asked to respond to and assimilate content that was planned and selected for them by someone else. Production of adult distance education programs requires a substantial investment of time and resources and planning often begins many months prior to actual implementation. Curricula are usually highly structured and instruction carefully timed, sequenced and articulated. The educational messages contained in these programs are substantially controlled by large, powerful organizations, such as governmental and educational agencies, and corporations. Advisory groups often consist of high-level representatives from these various agencies. While "progressive" approaches to distance education try to build in active learning strategies and various levels of learner interaction, educators remain largely performers for potentially huge audiences. Full learner participation in the educational process is rarely, if ever, achieved.

Adult distance education offers a powerful means of fostering human development within a political framework of furthering democratic ideals. To do this, however, requires a re- thinking of the ways in which we organize and plan distance education programs for adults. Developmental communications provides a frame in which to reconsider the planning and organization of distance education.

Developmental communication is the information exchange between developmental practice in the field and the organizations and institutions which are the resources for the development project (Nair & White, 1987b). This process frequently utilizes distance technologies as a means of communicating between two or more groups. Recently, a shift has occurred in developmental communication, away from what White (1993) characterizes as a process of "modernization" to one of participation. In the modernization approach, developmental communication is characterized by innovation diffusion models, where organizations dictate what is to happen in the developmental process and communication is largely one-way. Research, however, now demonstrates that the intended ends of this approach to developmental communication have been largely unrealized (White, 1993). The World Bank has acknowledged the failure of modernization, attributing this lack of success to a limited, overly technical perspective: "In the past, the Bank equated development with financial growth plus technological inputs, neglecting the social dynamics of change; this limited perspective doomed many projects" (Lahiri, 1992, p.157).

Increasingly, developers are recognizing the value of participatory developmental approaches. According to White (1993), "Participatory communication seems the most promising approach for decreasing dependency, building self-confidence and self reliance of the people and for transforming indigenous knowledge and heritage into modern-day solutions to development problems" (p. 8). Participatory development results in more commitment to the project's success and increased benefits to governments (Bhatnagar, 1992a). Participatory development represents a shift in emphasis from analyzing strictly economic benefits of development activity to a more people-centered approach. In participatory development, communication is a dialogue that allows the potential beneficiaries of the development to have input into the development process which are offered to improve their lives (Bhatnagar, 1992b).

Nair and White (1987b) define participatory developmental communication (PDC) as "a two way dynamic interaction between `grass roots' receivers and the `information' source, mediated by development communicators, which facilitates participation of the target group in the process of development." Communication between the target group and the "resource group" (e.g. content experts) is transactional and is facilitated by the development professionals. While the aim in PDC is to reach the poor with information needed for development purposes, the target group is often regarded as the dominant party in the relationship. They stimulate the flow of messages and communication and reflexively shape their responses to these messages. Ultimately, they are the primary beneficiaries of the development.

The communication process itself takes place over time using communication forms most appropriate for the interaction (e.g. video, FAX, electronic mail, etc.). Central to the PDC process is the developmental communicator who facilitates the development of messages, trains members of the target group in the operation of communication equipment and links them with development professionals. By the nature of the dialogue established, the target group is provided essentially the same resources and capacities of producing and conveying messages as are the development professionals.

Adult educators have played a significant role in providing some of the theoretical foundations for participation in development. Perhaps most visible in this effort is Brazilian educator Paulo Freire (Dichter, 1992; Nair & White, 1987a, 1987b; White, 1993). The work of the developmental communicator is similar to that of a democratically oriented adult educator. Thus, PDC can be readily adapted to adult distance education. In this next section, we will advance such a model and describe its chief components.

A Participatory Developmental Approach to Adult Distance Education

The participatory developmental education (PDE) model, as it may be applied to developmental distance learning projects, is portrayed graphically in Figure 1. Similar to PDC, the central aspect of this model is the communication message, which is facilitated by both a facilitator and a coordinator. The facilitator works directly with the target group (the primary learners), the sponsoring agency, and their gatekeepers and, indirectly, with the community as a whole. The facilitator also establishes a close working relationship with the coordinator, who directly coordinates the flow of communication between the facilitator and the content experts or resource persons (secondary learners) and, indirectly, with the broader world of information. The communication message is contained within a certain structure (media) and is delivered through specific processes (delivery). The specific phases of the model include: a) establishing a communication link between the primary and secondary learners; b) establishing a relationship between the facilitator and the primary learning group (PLG); c) identifying issues and problems of the PLG; e) disseminating information from the PLG to the secondary learning group (SLG); and f) disseminating messages from the SLG back to the PLG (messages be either individualized or group).

This process continues in an interactive fashion with the production, delivery, and dissemination of messages between these two sets of learner groups. The process ends in a consolidation or formalization of local support groups which then take the place of the facilitator. These groups can then continue to maintain communication with the secondary learner group for as long as necessary.

Establishing the communications link. Initiation of communication usually begins with representatives or gatekeepers from the primary learning group. The gatekeepers often initiate communications process for the PLG by contacting members of the secondary learning group or sponsoring institutions from that group for assistance in addressing some issues or concerns of the PLG. To establish and maintain the communications link, a PDE facilitator (analogous to the role of the developmental communicator in PDC) is hired to work directly with the gatekeeper and the PLG. The SLG will also identify someone who will coordinate communication between the PDE facilitator and the content experts or resource persons (SLG). The PDE facilitator and communications coordinator function as the education team, linking the primary learners and secondary learners.

In establishing the communications link, the structures and processes of communication to be used also need to be identified. Structure consists of the various ways in which the messages may be packaged, including video, computer, and print

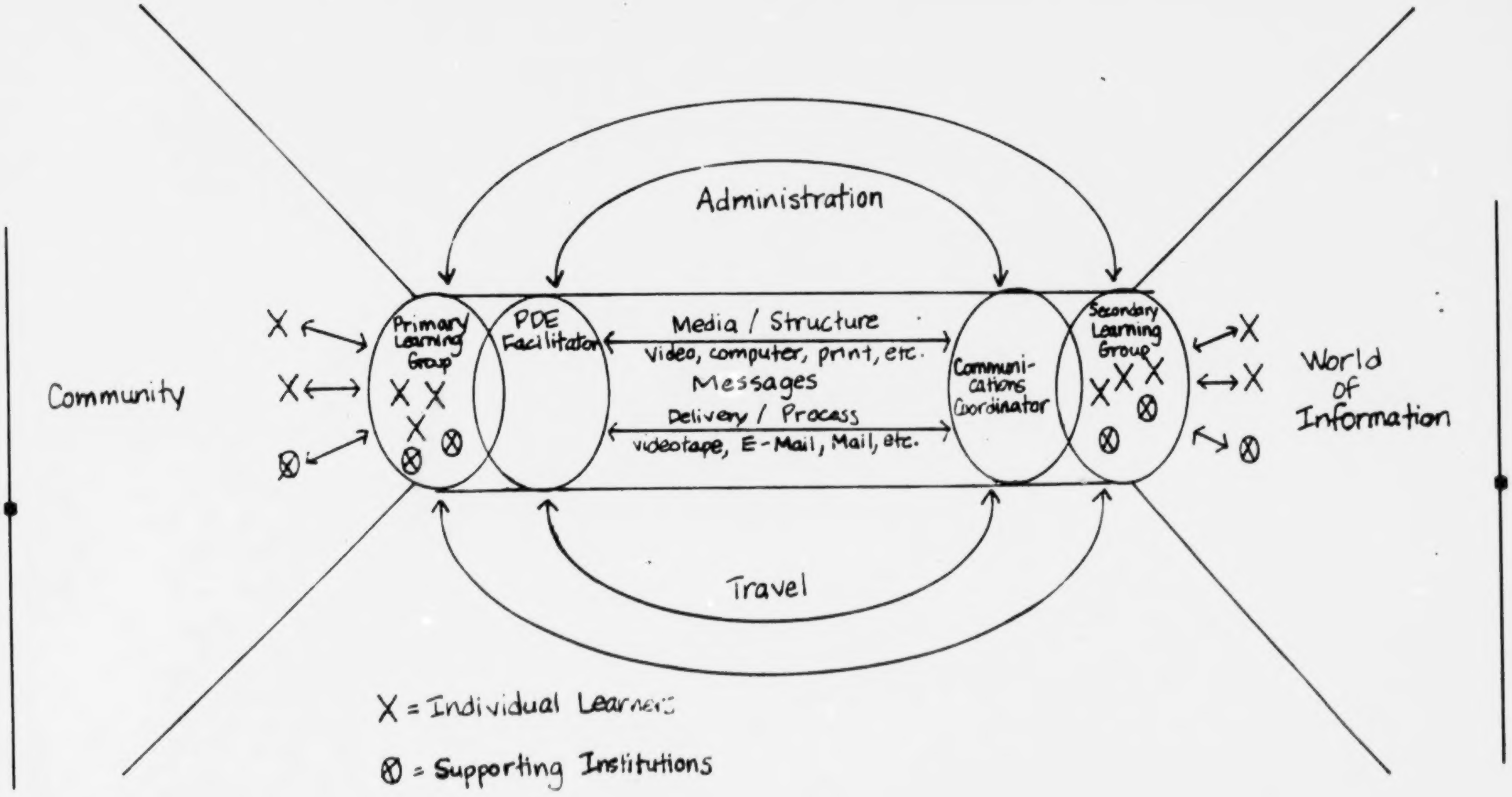

Figure 1.
Participatory developmental education model

formats. Process refers to the modes of delivery to be used in getting the messages back and forth between the primary and secondary learners. This could involve videotape, e-mail, postal services, and teleconferencing. Any face-to-face meetings that will be needed are also determined at this time. Finally, additional funding needed and other administrative structures necessary to manage the project over a period of time are identified and developed.

Establishing relationships with the primary learning group. Once the communications link is fairly well established, the facilitator continues to build relationships with the PLG. This involves the gatekeepers, individual learners who will be directly participating in the project, and members of the sponsoring institutions. In turn, these individuals will communicate on behalf of the larger community that they represent. Members of the gatekeeper group receive an orientation to the PDE process, including what will happen and who will involved and how. The facilitator also elicits from the gatekeepers the interests, goals, or concerns they bring to the project. They also spend time identifying questions they would like the primary learning group to answer.

Identification of primary learning group's issues or problems. The overall goal of this phase is to generate information, including issues and problems faced by the primary learning group, that the SLG will need to provide specific messages to the PLG. This process usually takes place within a first meeting of the PLG, consisting of several sessions. Initially, small groups within the PLG focus on a broad agenda setting, followed by critical analysis of this agenda, and identification of specific recommendations. Small groups then share these recommendations with the large group and any necessary revisions in the agenda are made. At this time, the PLG also takes stock of what was learned and accomplished during this first meeting. The gatekeepers serve a coordinating function in this process and may, at times, involved themselves as primary learners.

Disseminating information from primary learning group to secondary learning group. The objective of this phase of the process is for the SLG to generate messages that are targeted to the specific questions, concerns, and issues reflected in the message from the PLG. The PDE facilitator helps the PLG identify the specific secondary learners (content experts and resource persons) appropriate to their situation. The facilitator then categorizes the ideas generated by the PLG in a manner that is accessible and understandable to the SLG. The message is then packaged in the structure and delivery format agreed upon earlier and delivered to the SLG. The facilitator or the communications coordinator then arranges a meeting with the SLG to review the PLG message. In this meeting, the SLG develops recommendations for materials that will address the issues the PLG agenda. Needed messages are then packaged and delivered to the PLG or the gatekeepers. With the generation of this message, the full nature of the transactional dialogue between the PLG and the SLG is realized.

For example, the PLG message may be contained in a series of six, edited video taped meetings. These tapes, along with the original footage, are made available to the group of secondary learners and, at this time, the communications coordinator begins to move basic information through an E-mail network. The SLG may develop a series of packets, composed of short articles, and lists for recommended reading. Each packet would be oriented to address specific issues identified by the primary learners.

Disseminating individualized and group messages to primary learning group. Once the content of message from the SLG has been determined and packaged, it is then delivered to the PLG. In some instances, this message may consist of both individualized messages, targeted to the specific issues of the PLG, and a group message, such as a videotape that provides a general orientation to the kinds of resources available to the PLG within their supporting institutions and elsewhere and how they may access these resources.

A meeting (again, perhaps consisting of a series of session) of the PLG is arranged by the facilitator to review the SLG message. The PLG will also begin to develop peer

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support using geographical groups. These groups provide an additional structure within the PLG for disseminating and learning from the materials generated by the SLG. As this review is conducted, new questions and issues may be identified and recorded. Specific recommendations for continued use of the resources are identified. These recommendations are further categorized and packaged by the facilitator and then delivered to the SLG.

This series of transactional communications between the PLG and SLG may continue for as along as the PLG feels the dialogue is helpful. In each transaction, the PLG is setting the agenda and critically reflecting upon the messages received from the SLG. The PDE facilitator continues to play an important role in this continuing dialogue. The PDE process is used in a limited time frame to build a dialogical form of communication between the primary and the secondary learners. Through the process, the primary learners are taken through an organic process that progresses through stages of needs identification, resource evaluation, communications training, and organization of localized support. As the PLG becomes increasingly comfortable with the process and its skills, the facilitator will no longer be necessary and the process moves towards consolidation of local support groups.

Formalization and consolidation of local support groups. Formation of local support groups with the PLG serve to continue the relationship of the primary learners with the SLG. Within the transactional dialogue, these support groups take the place of the PDE facilitator and communicate directly with secondary learners or the supporting institutions.

Summary and Conclusion

The central aspect of the PDE model is the communication of primary learners with secondary learners through an education team consisting of the PDE facilitator and a communications coordinator. The process is essentially organic in the sense that the content of the project is not pre-planned or imposed at the outset. The primary learners initiate the dialogue with the content experts, who themselves become learners. The content experts gain insight into the problems faced by the primary learners and develop a base of information about needs, issues and specific problems from the record of transactions. Learners work through large group processes in large meetings, small groups, and individual research, reading and reflection. They remain essentially self-directed, but are required to build a community voice as well to articulate broader needs. The education team works to build a capacity in the learners for self-sufficient learning on the issues raised by the project. Any form or combination of communications media can be used that is effective in establishing and maintaining the dialogue.

In other variations of the PDE model the program facilitator may be located with the primary learning group, and the communications coordinator working with the secondary learners may be located at a supporting institution. Secondary learners may also be physically separate from the supporting institution and other institutions may play supporting roles by providing information and funding in exchange for the research opportunity.

We recognize that developmental approaches to distance education may not be appropriate in some cases. For example, PDE may not be suitable for the delivery of credit or certification courses. It does, however, provide a more democratically oriented approach to delivering technical and scientific information effectively for communities addressing specific problems. PDE is also feasible on a variety of technological levels and can effectively use "low-tech" communications, such as print and telephone in support of "high-tech" communications.

When conceptualized as a participatory developmental approach, adult distance education can further societal goals of lifelong learning and contribute to the realization of the democratic ideal inherent in the tradition of adult education. Unlike mainstream approaches to distance education, PDE views the program planning, development and the dialogue necessary between targeted populations and the delivering agencies as integral to the learning experience. The opportunities for research and problem-solving among content experts makes the distance education process a transactional learning experience.

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Classroom Social Interaction: A System of Trade-offs

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Social interaction in distance education traditionally described a process between the student and instructor that was mediated via correspondence. Historically this method of delivery has been plagued with problems associated with the adult student's sense of isolation and lack of affiliation contributing to drop out rates in correspondence courses of between 40 to 90 percent (Garrison, 1989).

To combat the challenges associated with slow teacher-student communications, distance education has embraced educational technology. Satellite delivery using a one-way video two-way audio interactive satellite system has been gaining in interest and popularity. This system comes close to replicating a "real classroom" environment for the off-campus student including the availability for increased social interaction. For the off-campus student this new delivery method has expanded an avenue for social interaction, both student-to-student and student-to-instructor, within the institutional setting. It is unique because it offers the student and teacher the opportunity for immediate social interaction bridging the gap of distance.

Problem

Several basic questions surface when investigating adult classroom social interaction at an off-campus satellite location. First, how does classroom social interaction effect the student's feelings concerning their:

- desire to continue or drop-out of the class?
- perception of how well they are learning?
- social integration with the classroom setting? and
- integration within the academic institution?

Once information on classroom social interaction is obtained it is necessary to explore how classroom social interaction can be used to better meet student needs to:

- gain a stronger commitment to complete the class?
- improve learning?
- feel more a part of the class?
- feel more a part of the program and university?

Methodological Approach

The exploratory nature of the research questions was the driving force behind the development of a qualitative case study of adults enrolled in a satellite delivered (one-way video, two-way audio) graduate class sponsored by the University of Nebraska. In the spring of 1992 seven adult students were interviewed at two different remote locations, one being an urban worksite and the other a rural regional educational institution.

The interviews followed the guidelines established by McCracken (1988) for a long interview. Following the developed protocol for the students and the instructor, the interviews were tape recorded and later transcribed verbatim. After the data had been reviewed and interpretations made, written member checks were implemented. Additional data were obtained through multiple observations of the remote and on-site classroom environments where descriptions of the setting were recorded on an observation worksheet.

There were three phases of interpretative analysis. In phase one the data were analyzed following Strauss and Corbin's (1990) procedures for open coding. After categories were collapsed and cases compared exploratory variables emerged under the categories of program participation, learning, social integration, and academic integration.

In the second phase of analysis the data were reexamined across cases looking at both the initial and collapsed categories. A broader theme, the informalization of the classroom environment, was proposed through exploratory variables that identified a different classroom atmosphere at the remote sites as a function of the instructor's absence.

In the third and final phase of analysis the data were again reexamined across the exploratory variables and themes identified in phase one and two. An underlying theme of "trade-offs" emerged. It reflected an aspect of this method of education, with face-to-face interaction being the "pawn" in the trade.

Coding of the interview data was organized by the use of a commercial software computer package, the Ethnograph (Seidel, 1988), designed for qualitative studies.

Findings

During the multiple phases of data analysis three key findings for the adult educator were revealed. First, a different type of educational atmosphere was created when the instructor was absent from the classroom site. There was an "informalization of the classroom environment" which has the potential to positively impact the adult learner. Second, social interaction for an off-campus student in this situation was considered a system of cost/benefit "trade-offs" with social interaction being the pawn in the trade. Third, the students identified several ways to improve social interaction for the off-campus student which would reduce major limitations of this delivery method.

Informalization

Informalization, as it was defined, recognized the absence of the instructor on site as the traditional authority figure. This absence offered the students an informal class atmosphere unique to the educational system. It allowed students the freedom to exercise control and concentrate on a very individualized approach to learning as recognized by one student:

> I think it [interaction with students at the site] improves my enjoyment of the class because we feel freer to comment on the content of the presentation, the setting, the things that occur. Comments that we would probably just have to think to ourselves if we were in the classroom [on campus]. And so it's more open, probably the way things ought to be if we lived in the ideal world.

Factors related to the new informal classroom atmosphere were identified which facilitated as well as inhibited students to exert control in social interaction.

Trade-offs

Classroom social interaction was a pawn in a trading scheme for the off-campus student. There were potential costs and benefits as this student stated:

> I guess one thing you pretty much should know coming in to this program is that, or you should know, there are trade-offs. The trade-offs are that interaction, that ability to get to the teacher, the ability to get information when you need it. and what you get in the trade-off is the convenience of having things delivered to you and the ability to put classes around work, rather than work around classes. I think people who have had trouble with this, have kind of had trouble with that concept, with those concepts. This isn't a complete win/win situation for you.

Students experienced costs and benefits related to the impact of social interaction on learning. The two basic costs were: 1) the loss of spontaneous interaction with the instructor, and 2) inappropriate classroom behavior by on-site students (other students talking while the instructor was talking). The key benefits influencing learning included: 1) collegial interaction with the instructor, and 2) the opportunity for a high level of involvement in the educational experience.

Students also experienced potential social interaction costs and benefits toward their feeling a part of the group. The primary cost was the exclusion of the student from the on-site and on-campus groups. The major benefit was the on-site student camaraderie.

Concerning their feelings of being a part of the academic program or university the potential cost was the student's isolation from the academic program and university and the potential benefit was a feeling of affiliation with the "CorpNet" program, a division within the entity administering the distance education component of the University of Nebraska

The four costs and four benefits in this scenario represented critical trade-offs, they were individually interpreted and "weighed" in the decision-making process. For example, several students mentioned that inappropriate on-site interaction distracted from learning but the advantages of informally sharing information far out weighted the disadvantages. However, one student did not feel this way. The interaction was so distracting for the student that it was only seen as a disadvantage. A graphic representation of the system of trade-offs is found in figure 1.

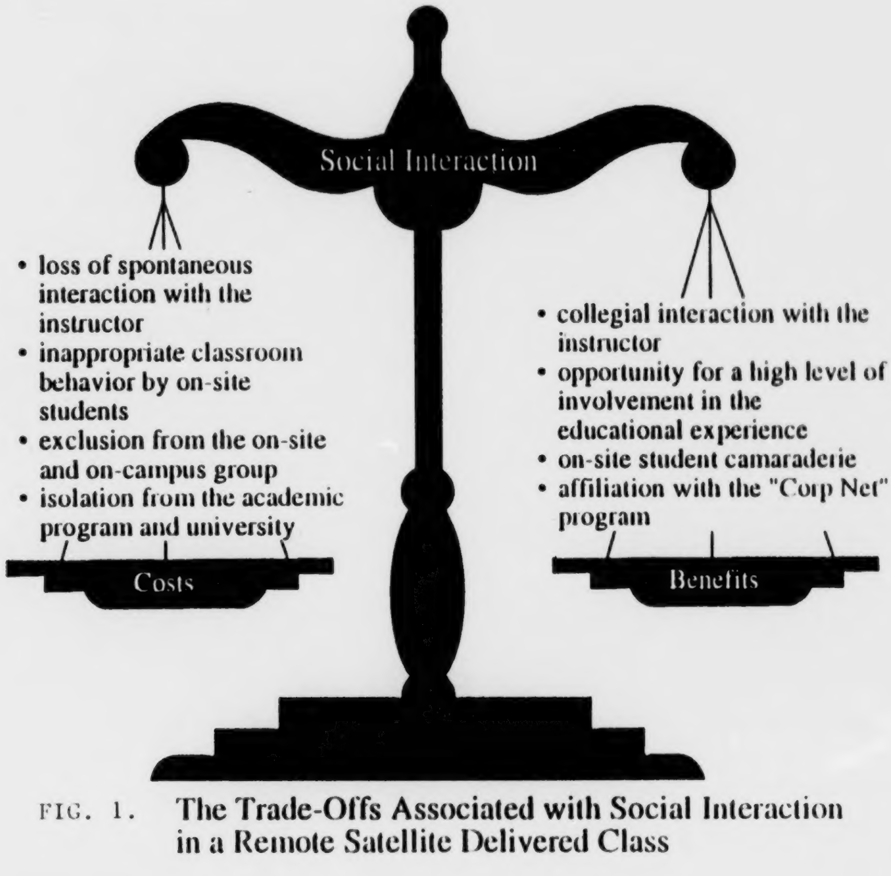
Social Interaction
• loss of spontaneous interaction with the instructor
• inappropriate classroom behavior by on-site students
• exclusion from the on-site and on-campus group
• isolation from the academic program and university
Costs
• collegial interaction with the instructor
• opportunity for a high level of involvement in the educational experience
• on-site student camaraderie
• affiliation with the "Corp Net" program
Benefits

FIG. 1. The Trade-Offs Associated with Social Interaction in a Remote Satellite Delivered Class

In essence classroom social interaction was perceived by students as having **the potential** to either enhance or detract from their: 1) commitment to complete the class 2) ability to learn, 3) capacity to feel a part of the class group, and 4) capacity to feel a part of the academic program or university.

Ways to Reduce the Costs Associated with Classroom Social Interaction

Of all of the suggestions that were given by the students for ways to improve classroom social interaction, three kept reappearing. First, it was the desire of the students to actually meet the instructor and to do this before the end of the semester. Currently it is a common practice in this program to have the students at the remote sites present final projects in person to the on-campus class. Students would have greatly appreciated the opportunity to meet the instructor and the on-campus students early in the semester rather that at the end. One student even remarked that it would be nice if all remote students could attend one class on-campus toward the beginning of the semester. Realistically that could only happen if the class was a night class and even then some sites, due to extreme distance, would not be able to participate.

When this is not feasible, methods that the instructor can use to increase one-on-one time with the off-campus student will be appreciated. This may include being available for phone calls or initiating or responding to written correspondence that is then sent directly to the student. Having access to the instructor is a critical issue.

A second reoccurring suggestion was the desire of the students to get to know each other. This manifested itself in many ways, from the suggestions of having the students introduce themselves to each other on the system to having the staff at the CorpNet program make available information on who is involved in the program. Students see this as an integral part of a positive educational experience. Creative ways of doing this are possible. It is perhaps more a matter of making it a priority at the administrative and classroom level.

Another factor that surfaced repeatedly in discussions was the feeling of interrupting someone when off-campus students used the microphone system. Due to a time delay and lack of knowledge by the instructor that there was an incoming comment, students at remote sites would end up breaking into conversations. It made them feel "rude" or uncomfortable which inhibited their desire to comment. If there could be a way to make the instructor aware that there was an incoming comment, the students would feel more at ease making them. One student even suggested having a red light flash in the on-campus classroom for the instructor to see when someone at a remote site was wanting to use the microphone. Adding some type of in-coming call indicator could greatly enhance the and ultimately the quality of student interactions in this distance education situation.

Conclusion

Social interaction is seen as a core phenomenon impacting many aspects of the classroom environment at a off-campus satellite delivered site. anything behavioral or mechanical that can be designed to make the communication process easier within the satellite delivered class will positively impact the student's desire to complete the course.

One of the basic ways social interaction impacted the learning process was through the ability of students to gain new information from others that could be applied in the work setting. Interaction with other students at the site and with remote students at other sites had a positive impact on learning for this reason.

Interaction's "darker side" was also noted when students interacted too much on-site prohibiting others from listening to the instructor. This is a situation unique to the remote classroom environment which should be acknowledged. Instructors can counteract this tendency by calling on remote student periodically by name. The students in this study acknowledged, although grudgingly, that this type of increased instructor interaction would help keep informal interaction to a minimum eliminating the problem of inappropriate exchanges.

Students at the same remote site play an influential role in making the individual student feel like a part of the class. Informal socializing within the group helps form a "bond," making it easier for them to feel a part of the class. Formally, the students also feel an increase in enjoyment by supporting each other as impromptu tutors when questions arise. When the camaraderie is absent and the student is alienated, the inability to feel a part of the class can substantially reduce the student's enjoyment.

For adults in this setting, the social classroom interaction may help to bridge the gap of distance for the student, filling a void created by the absence of the instructor. Because of the many benefits to students, opportunities for group settings should be encouraged by educational coordinators involved in distance education.

When it came to the feeling of being apart of the institution, there was a sense of frustration and loss. The students acknowledged that they did not expect to feel a part of the institution in the same way that an on-campus student would feel, yet in their own way they wanted to be included. In particular, students were interested in both being aware and participating in some of the opportunities and privileges afforded to them by being a part of the institution. If they felt a part of the university, it was the "CorpNet" program that provided the link. Their affiliation with this entity helped them feel like they were a part of a larger organization.

There may be a misconception within the academic community that adults do not care about feeling a part of the university. In an interview with the instructor for the course, this opinion was expressed. However, extensive research on traditional students and more limited research on adult students would indicate that this is not the case. Feelings of being a part of the institution or being affiliated have been shown to positively influence completion (Allen, 1990). the problem may be that institutional integration has always been defined automatically by undergraduate "standards". what should be done is to look at how adult students, and in this case those living in communities away from campus, can still be included in university life so that they feel a part of the academic institution. Academic integration needs to be defined by the adult student and supported by several entities within the institution to be successful.

As an educator it may be easy to take traditional classroom social interaction for granted. But in a satellite delivered class, taking social interaction for granted is a big mistake. It needs to be recognized as a unique phenomena requiring special attention. It has the potential to enhance or detract from the educational experience. The goal of the adult distance education is to not only acknowledge classroom social interaction's importance but to creatively facilitate positive student/student and student/instructor communication.

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Interaction Analysis Of An Inter-University Computer Conference

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Introduction And Statement Of The Problem

Computer mediated conferencing (CMC), has the potential to transform education. It has the capacity to bring diverse learner groups together. It will shift the traditional classroom organization to more group or team centered learning. It can overcome, with communication technology, the problems imposed by distance or separation of students from teachers and other students.

Will CMC provide educators a means for transforming learning to produce students who see themselves as responsible creators of their own knowledge and meaning, particularly those students learning at a distance? This question will be answered by investigation into the pedagogical applications of CMC.

The purpose of this paper is to present a beginning descriptive analysis of a inter-university computer-mediated conference that linked graduate students at several universities to discuss issues related to distance education, to gain an understanding of the learning processes that occur in a computer mediated discussion. A brief comparison will be made of two endeavors (Spring 1992, and Fall, 1993) of this CMC class discussion model which will show the different compositions.

Background And Objectives Of The Conference

"Globaled," a computer conference using a listserve at the University of New Mexico, in Spring 1992, was designed to provide an opportunity for graduate students at several universities to discuss issues related to distance education and to experience distance education through CMC. Globaled was premised upon a learner-centered collaborative learning model where the learner would be an active participant in the learning process involved in constructing knowledge through a process of interaction and discussion with learning peers and instructors (Gunawardena, 1992). The conference had participants in graduate classes at four universities, Florida State University (FSU), University of New Mexico (UNM), University of Oklahoma (UO), and University of Wyoming (UW), with students from other universities who also participated as individuals in the discussion. The moderator and the main technical assistant were from the University of New Mexico. Professors of the participating classes at the other universities as well as technicians assisted at other sites.

The participants of both Globaled conferences were asked to make introductions during the first two weeks of the semester long conference. Each university class then moderated the discussion of a question for a period of two weeks. The final week, individuals discussed their reactions to the CMC experience. The difference between the 1992 and 1993 conference was that in 1992 each university posted a different question concerning the topic of distance education, while in 1993 each university posted and commented on the results of the similar survey conduct by classes at the different sites.

Review of the Literature

Discussion in the literature of evaluation and analysis of CMC as an educational tool is just beginning. Morgan (1992) notes research that suggests that the nature of groups and communication in groups is changed when the affiliation is computer-mediated. The access to others across social categories and without physical locations constraints increases formal and informal sharing of information. Discussions are more open and democratic, with less influence of status.

Changes in the function and dynamics of group communication within the learning process have important implications for the pedagogical uses of computer conferencing. Harasim (1990) states that interactivity, CMC's most striking characteristic, is the factor with the most impact on learning. Group interaction unhindered by time and location restrictions, would encourage higher quality learning and invite a collaborative group process.

The quantitative method of content analysis is identified by many authors as a way to understand the effectiveness of computer conferencing as an instructional strategy. However, Morgan (1992) comments on the paradox of the fact that given available the transcripts of all the conference interactions, that this method is the least used. Henri (1992) suggests that content analysis is an appropriate method to discover how CMC supports the learning process of the participant. She suggests that this approach would allow analysis of the social, psychological, and cognitive dimensions leading to a discovery of the processes of learning inherent in the test of the discussion of the conference.

Method of Analysis and Findings

The qualitative analytical method of straight description was used in this beginning study of Globaled to provide an understanding learning processes that occur within the context of the computer conference, using categories and an organizational scheme proposed by Henri (1992).

The first level of analysis suggested by Henri, is intended to describe, understand, and judge the quality of what was said in the conference. The transcripts of the conference were studied as the product of the conference. The amount and flow of the messages were considered as a whole.

In the protocols of the conference the moderator encouraged spontaneous participation by the students, asking them not to be concerned by syntax, spelling, grammatical, or typographical errors. Many responses were a summary of small group discussions that took place in the onsite classroom, and were then posted to the list. While these messages demonstrated logic, clarity and relevance, it reflected consensus of group rather than individual learning as a result of the group process. It was also clear that instructors of the classes involved in this conference were not relying on these transcripts to judge individual student's progress in written communication of their ideas. It is more likely that a group response was encouraged to help individuals overcome any anxiety they felt in participating in this new medium and to overcome technical or access-to-equipment problems some individuals faced. In Globaled '93, this did not occur; individual responses emerged.

The second level of analysis is to closely examine the "process" which structures the content and shapes the patterns of the conference. This organization was designed to investigate three dimensions of the process of the conference: participation, social presence, and interactivity.

Participation is defined as "the compilation of the number of messages or statements transmitted by one person or group." (Henri, 1992, p. 123) Sixty-five participants were subscribed to Globaled '92, fifty-eight (83%) of whom posted a personal introduction. A total of 252 messages were posted to the conference, 23% of which were introductions.

Participants at UNM contributed an average of 4.85 messages, an average of 4.11 messages from OU, an average of 3 messages from FSU participants, and an average of

2.11 from UW. Over the thirteen week session, this would indicate that students entered the discussion less than once every two weeks on the average.

The first question was posted during the third week by UNM as the host institution. There were 23 messages posted addressing this question, 9% of the total conference. The second question was posted by FSU in the fifth week, 12 messages responded, 4% of the total. Wyoming posted the third question in the seventh week, 22 messages responded, 9% of the total. Oklahoma posted the fourth question in the tenth week, and 11 messages responded, 4% of total. The flow of the messages corresponds to the flow of activity at the different sites. There was a flurry of response as questions were posted, then the activity diminished.

Social presence is defined as "statements or part of statements not related to the formal content or subject matter." (Henri, p 126). In this analysis the unit of measurement, a statement, was a complete sentence. The number of both social and content statements corresponded with the total number of messages in the 1992 conference. In the 1993 conference the social statements increased as those statements pertaining to the subject matter decreased.

STATEMENTS IN MESSAGES

Months	Total	Social	Content 1992
February	69	4%	96%
March	434	12%	88%
April	186	3%	97%

Months	Total	Social	Content 1993
October	337	20%	80%
November	386	45%	55%
December	99	64%	36%

"Computer mediated conference most striking characteristic is interactivity, which is a factor with the greatest influence on learning" (Henri, 1992, p. 119). Interactivity is defined as a chain of connected messages. Henri further defined inter-activity as explicit interaction (statements that are a response and/or commentary to another message in a direct reference to the name of the sender), and implicit interaction (indirect response and indirect commentary not making a direct reference to the sender or previously stated idea), and independent statements which do not lead to further discussion.

In Globaled, 1992, the first discussion question, all but 6 of 22 messages responded directly to the initial posting of the question (moderator's messages excluded). When the messages were examined sentence by sentence, there were 33 implicit statements, 39 explicit statements, and 23 independent statements for a total of 95 interactive statements. As time progressed implicit statements were replaced by explicit statements. The independent statements were randomly posted throughout the time of the discussion of the question. The analysis of this interactivity shows that the participant were interacting indirectly with the topic, not directly with another person as the discussion of the question progressed. The analysis shows that participation was low, social presence was low, and interactivity was low; thus, the learners seemed to have shared information but have not produced new knowledge.

Analysis of the cognitive and metacognitive dimensions reveals the 'process' of learning, attempting to measure how actively the learner acquires information and uses it to produce new knowledge and strategies adopted by the learners, as they reveal them in dealing with the subject. "Content analysis should be designed to identify the indicators of these strategies and the skills connected with the use of them." (Henri, 1992, pg 124). The five indicators of the foundation of learning in Henri's model are elementary clarification, indepth clarification, inference, judgment, and strategies. Forty-nine statements indicated elementary clarification, those identifying the elements of the problem posed in the discussion question. Fifty-one statements indicated indepth clarification, those addressing underlying values, beliefs and assumptions. Eighteen statements indicated inference, drawing conclusions or propositions which proceed from previous statements. There were two judgment statements, indicating evaluation of previous conclusions, and nine statements indicating strategies, those proposing possible actions or solutions.

The results of this analysis must be interpreted in relation to the cognitive task assigned to the learners. If knowledge acquisition is the objective, the high levels of clarification and inferences activities would be expected. If problem resolution is the objective, then a broad range of skills would appear. The high levels of clarification statements show that the participants of this conference reached the level of information sharing, but not knowledge construction.

In computer mediated conferences written metacognitive processing is more apparent than in a face-to-face situation. The "thinking out loud" on the screen indicates mental processes and cognitive mistakes or weaknesses. The research showed few metacognitive instances--two statements. Since knowledge acquisition was more apparent than problem resolution, metacognitive messages would not be too frequent.

Conclusions of Analysis of Research

The Globaled conference of 1992 seemed very structured possibly because it was the first attempt to run a listserve and the technical problems of combining the different institutions. It seemed to be an exchange of information on the topic rather than social. Postings were done immediately after the questions were presented. Very little social interaction took place. The majority of the postings to the conference were done as groups at the individual institutions where the social interaction was taking place. The participants at the distant sites did not seem to develop group cohesiveness as a whole on the network. They were in their groups at their individual institutions. They only did or tried to do the task that was assigned--posting their responses. The task of collecting other individual's points of view at other sites, being able to use the technology to transfer those points of view, and knowledge acquisition were objectives of the conference, and they were met. The objective of learner-centered collaboration where the participants actively develop into a whole group or several different smaller groups was not apparent through the transcripts. This would indicate that the conference would need to be designed differently to meet this objective. The 1993 Globaled Conference had the same objectives; the results were very different. The composition encouraged an increase in social interaction, possibly because of two reasons: (1) the boredom students felt in discussing findings to the same questions, and (2) individuals were interacting on the network because they were not interacting at their different sites.

Implications for Further Research

Future research should address the implications of various levels of participation from each university, the effect of moderators intervention, ratio of professor to student messages, and whether messages were generated from a university more often during the week that particular class had responsibility for posting research and leading the discussion.

Looking into the group or community aspect of the participants in the 1993 conference, a researcher could identify what factors encouraged cohesiveness of the group. How can the moderators or participants change the flow of the messages? Still, the most important issue is how to get a higher percentage of the subscribers to participate and become an active part of the learning group/community.

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Integrating Distance Learning Activities to Enhance Teacher Education Toward the Constructivist Paradigm of Teaching and Learning

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Abstract

This course development effort is based upon the new paradigm of teaching where knowledge is constructed by both the learner and teacher, and both are active discoverers who engage in authentic learning. The focus of this paper is to share the constructivist based design and development of the course as well as the resultant student projects which integrated distance learning technology within the face-to-face college level course. Student selected research topics and supportive telecommunications projects provide examples of preservice teachers' efforts. Learner frustrations as well as positive experiences with the distance learning activities are also reported. The success of the course design with the integrated telecommunications projects are the basis for the conclusion that distance learning activities support the constructivist paradigm.

The College of Education at the University of Wisconsin - River Falls (UWRF) received a grant from Ameritech to (a) infuse telecommunications technology into the teacher preparation program and (b) encourage area K-12 public schools teachers to engage in telecommunications projects. Ten local school teachers and ten UWRF faculty members were awarded honorariums for participation in this grant which is entitled: "Telecommunications Supported Project Based Learning to Enhance Higher Level Thinking Skills", (Albertson, 1993). Within the context of this Ameritech grant, the goal of this particular project was to integrate distance learning experiences for junior and senior level preservice teachers enrolled in a capstone course entitled *School and Society.* This course development effort is based upon the new paradigm of teaching where knowledge is constructed by both the learner and teacher, and both are active discoverers who engage in authentic learning. The focus of this paper is to share the constructivist based design and development of the course as well as the resultant student projects which integrated distance learning technology within the face-to-face college level course. Distance learning within this context is defined as a form of self-instruction which does not require an evaluation by the organization providing instruction (Verduin and Clark, 1991).

The Constructivist Paradigm

The work of developmental psychologists Piaget, (1963), and Vygotsky, (1978) set the precedent for questioning whether or not direct teaching methods were responsible for student learning. Preservice teachers are introduced to these researchers and their work early in the teacher education program during a required Educational Psychology course. As these college students are introduced to the notion that the learner discovers and constructs meaning from their environment, they are encouraged to rethink their view of what it means to teach. This new role of the teacher does not depict one who transmits knowledge but rather one who designs experiences where the learner is required to examine thinking and learning processes; collect, record, and analyze data; form and test hypotheses; reflect upon previous understandings; and thus construct their own meaning. In her Educational Psychology textbook, Woolfolk (1993) describes the "constructivist view of learning" and the "cognitive mediational view" as follows:

> Whatever the name, the key idea is that students actively *construct* their own knowledge; the mind of the student *mediates* inputs from the outside world to determine what the student will learn. Learning is active mental work, not passive reception of teaching. In this work other people play an important role by `providing

> support, challenging thinking, and serving as coaches or models, but the student is the key to learning. (p. 485)

With this view of teaching and learning in mind, the challenge becomes one of designing course requirements which require the learner to mediate and construct with the help of others. Engaging preservice teachers in distance learning activities seem to be a logical choice for encouraging them to seek the assistance of others yet take responsibility for constructing their own meaning.

Constructivism and Instructional Design: Some Guidelines

Instructional Systems Design experts have been engaged in a dialogue among themselves as to whether constructivism and instructional design are compatible. Reigeluth (1989) argues for a "new mindset" to combine constructivist elements in the instructional design models. Dick (1991) argues that constructivist interventions are different from instructional interventions and proposes a dual approach. Still others (Carroll, 1990) argue that the fundamental views of learning from the constructivist view is simply incompatible with instructional design theory. While the debate among instructional systems design professionals continues, those of us who value constructivist learning theory and are actively engaged in course design look for systematic methods to enhance our instruction.

In a recent review of the literature on the aforementioned debate, Lebow (1993) proposed "Five Principles Toward a New Mindset" as constructivist values which might influence instructional design. These principles also seem to support the use of opportunities for learners to engage in distance learning experiences as a means of challenging preservice teachers to construct their own meaning with the help of others.

> Principle 1. Maintain a buffer between the learner and the potentially damaging effects of instructional practices.
>
> - Increase emphasis on the affective domain of learning.
> - Make instruction personally relevant to the learner.
> - Help learners develop skills, attitudes, and beliefs that support self-regulation of the learning process.
> - Balance the tendency to control the learning situation with a desire to promote personal autonomy.
>
> Principle 2. Provide a context for learning that supports both autonomy and relatedness.
>
> Principle 3. Embed the reasons for learning into the learning activity itself.
>
> Principle 4. Support self-regulated learning by promoting skills and attitudes that enable the learner to assume increasing responsibility for the developmental restructuring process.
>
> Principle 5. Strengthen the learner's tendency to engage in intentional learning processes, especially by encouraging the strategic exploration of errors. (p. 5,6)

These principles have served as the guidelines for the integration of distance learning opportunities in the capstone course *School and Society* at UWRF. For example, preservice teachers selected their own research topic and supported their thinking with the use of telecommunications. This provided a personally relevant context, promoted autonomy, and helped to develop skills that support the learning process. In addition, the use of telecommunications as a distance learning activity embedded the reason for learning into the activity itself and supported the learners as they restructured their view of teaching and learning.

Course And Learner Objectives

The specified objectives for the preservice teachers enrolled in the School and Society course are discussed herein. Upon completion of the course students are expected to be able to:

1. Demonstrate an understanding of the basic historical foundation for the uniqueness of American public schools.
2. Communicate a familiarity with the philosophical systems and reform initiatives and describe their impact upon the evolution of the modern public school.
3. Apply analytical skills relevant to evaluating the school in historical, social, and philosophical perspectives.
4. Apply social, philosophical, and historical perspectives to ethical dilemmas and case based decision making.

Authentic learning toward these objective was supported by providing opportunities for multiple telecommunications enhanced projects. For example, what better way to demonstrate the uniqueness of the American system of financing public education than to compare it to the financing system of another country? Or what better way to learn perspective taking for evaluative analysis than to engage in dialogues with teachers and educational experts at a distance? Preservice teachers will also become more familiar with the potential uses of distance learning technologies for the K-12 classroom as a reform initiative in the modern public school.

Course Design

After preservice teachers were introduced to ERIC as a means of researching a question they wished to answer, they were given hands-on workshops for developing telecommunications skills and an awareness of information exchanges (Internet, News, Gopher) to support their research. During the course of instruction where they had been introduced to the philosophical, historical, sociological, financial, legal, and ethical foundations of the American educational system, students designed and initiated their own projects. It is this fluid and personalized curriculum which is of greatest interest to the constructivist model and the focus of analysis in this report.

Some ideas were introduced as examples of possible projects and students have continued sharing their personal project descriptions with other members of the class as they take shape. Ideas for sample projects which were initially introduced by the instructor are listed below:

1. Supplement basic research from information sources in addition to ERIC such as Peacenet, Internet, Bitnet, etc.
2. Design a cooperative distance learning project for local fifth grade students.
3. Analyze the fifth grade project for affective or cognitive outcomes.
4. Analyze curriculum issues by developing dialogues with teachers in content areas through e-mail.
5. Explore multi-media resource development in lieu of a textbook driven curriculum.
6. Self-reflect through exchange of ideologies between teachers and/or other preservice teachers.

Preservice teachers have been instructed to design their own projects for authentic learning and assessment which meet the aforementioned objectives. These projects are ongoing and have been preserved from inception to completion through the use of portfolios. Each student has been required to maintain a portfolio which will include a journal of original ideas, thoughts, feelings, anxieties, and insightful experiences; a record of distance learning exchanges; documentation of information gathering, data collection, research, evaluation, or analysis at various stages of completion; feedback from peer partners at various stages of project completion; a multimedia presentation of the project as a final exam; and a written summary of how this experience effected their philosophy of teaching. A pre and post comparison of philosophy of education statements will provide a means of assessing the impact that this constructivist distance learning curriculum had on the preservice teachers' philosophy of education and will be analyzed upon completion of the semester. An initial analysis of the portfolios six weeks into the semester has provided an interesting array of projects.

Preliminary Results

Projects Selected

The following is a summary of research topics and accompanying telecommunications projects which students chose. Many students have changed their selected areas of interest and the topics listed below are the current focus.

Research Paper Topic	**Telecommunications Project**
Year Round School	Collect School Calendars from other Countries
Technology in European Schools	Survey Teachers and Students in exchange programs with UWRF
History and Finance of Head Start	Head Start programs in Minnesota
Peer Support Programs	Practical Application of Peer Support Groups
Computers in Art Instruction	Examples of Computers in Art Curriculum, Transfer graphics via telecommunications
Sex Education in the US	Sex Education in Other Countries
Nutrition in US Health Education	Nutrition in Health Education Abroad
Discipline in US Schools	Discipline Problems in European Schools
US Preschool Programs Available	Preschool Programs Around the World
K-12 Teachers Attitudes Toward Telecommunications for students	Survey Local K-12 Teachers using Telecommunication
Effects of Technology on Elementary Students	Observe and interview local students involved in telecommunications projects
How do Computers Effect the Classroom?	Develop Curriculum Project for Local Fifth Grade Students
Teaching Techniques in Social Studies USA	Social Studies Teaching Techniques in Russia, Japan, and England
Education and Native American Needs	Telecommunicate with Ojibwe School
How does the use of English Impact Mexican Schools	Telecommunicate with Mexico to verify

Effects of Calculator use in Math Class	Survey Math Teachers on use of Calculators in Math Class
Math Curriculum Comparisons	Talk to Teachers About Math Curriculum
Does Children's' Literature Vary by State	Talk to Teachers About Children's Literature in different States
Home Schooling and State Required Assessment	How Parents of Home Schools Evaluate Student Achievement
Academic Credit For Athletics	Inquire How Teachers Feel About This
Guidelines for Developing Telecommunications Projects	Work with Local Fourth and Fifth Grade Teachers in Developing and Implementing Arctic Trip, World School for Adventure

Formative Evaluation

After students had an opportunity experiment with their telecommunications project, they were asked to share their frustrations as well as any positive experiences they incurred. The following excerpts from this formative evaluation provided feedback for specific action to be taken by the instructor to support the students self-learning with the distance learning technology.

Learner Frustrations

The overwhelming response from the students when asked to share their frustrations in working with telecommunications involved some sort of time variable. Students either complained that they did not have enough time in their schedule to access their e-mail, send a message, or search for an information locator which fit their topic. Others complained about the time between sending a message and receiving a message, or the fact that they could not just take a few minutes between classes to access the system but must "dedicate 30 to 60 minutes to send/receive messages".

Most of the students in this course are employed, and none of them have the technology in their homes to support the activity. There are a minimal number of terminals available in campus housing, but because these are Juniors and Seniors, only a few of them live in university housing. As a result of this learner feedback, one class period was set aside for students to contract for time with technology. Students were asked to write specific goals and objectives for their "Time with Technology Contract".

Another frustration commonly cited was that students were having difficulty with Gopher. Consequently, a workshop was arranged during class time so an expert could walk students through the Gopher menu system (for the second time) in an on-campus computer lab.

Four students (out of 25) stated that they were not having any success with the distance learning technology. A special assistant was made available to work with these students on a one-to-one basis during two class periods.

Positive Experiences

The positive experiences far out weighed the frustrations and are far too numerous for an exhaustive list within the scope of this paper. What follows is a cryptic list which represents the breadth of responses:

1. "It's fun to explore areas other than your topic, like sports letters."
2. "I have received a chapter of a book on my topic from an expert in Canada."

3. "Classroom teachers are very helpful, willing to share their personal experiences."
4. "Received a reply from a school counselor in Virginia who offered all the help I need."
5. "Found a pen-pal to write in French."
6. "I am amazed at the ease with which I am able to communicate with people I don't personally know but share a common interest with in Social Studies Education."
7. "I am a little more excited about teaching and a little relieved because I know that there is help at the push of a button."
8. "People are interested in my research topic."
9. "Today I finally received my first messages, it was like a surprise gift!"
10. "Telecommunications has changed my view of teaching by opening up new ways for students to learn through exploring and hands-on. Telecommunications brings the world closer to the classroom and lends itself to authentic learning."

In reviewing these and other comments, elements of a constructive classroom emerge. Students demonstrate a sense of autonomy and initiative yet are encouraged by responses and interaction with a community of scholars. These preservice teachers are learning the value of primary sources and have identified teachers in the classroom as experts. Students are engaged in dialogues with others and as a result feel empowered as they make meaning. This distance learning experience has provided an opportunity for students to make the connection between theory and application, between research and real classrooms, between preservice and experienced teachers. This author is very pleased with the preliminary results.

Conclusions

The integration of distance learning opportunities in this face-to-face classroom has been truly supportive of the constructivist paradigm. Students have been actively engaged in constructing their own knowledge and mediating input from the outside world. Students demonstrated a willingness to share successes and failures during class which encouraged and assisted others. Students appeared more excited and serious about their research paper and expressed concern that the selection of the topic should have some practical significance and meaning for their professional development. Distance learning activities encouraged autonomy and independence as well as cooperation, support, self-regulated learning, and helped to make the instruction personally relevant.

Creating a real world curriculum which makes use of available distance learning technologies will be an integral component of the school of tomorrow. Teacher Educators must find ways to model this living curriculum for their preservice teachers so that as K-12 teachers they might be better prepared to engage their students in this active learning process. The fiber optics network proposed by the current administration will provide a "superhighway " for distance learning activities. Tapping into this technology will change the environment of learning from that of a classroom to that of an endless combination of resources and capabilities. Educators must be prepared for and involved in that opportunity as it unfolds.

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Students' Perspectives Of Telecourse Instruction

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Introduction

Researchers have examined the academic outcomes of telecourse and conventional classroom instruction (Chu & Schramm, 1975; Whittington, 1987). As a rule, telecourse students perform as well as on campus students as measured by grades, objective tests, and other related standards. Additionally, telecourse students seem to be generally satisfied with their telecourse instruction as assessed by various rating scales and surveys (Biner, 1993; Debelq & Scates, 1989; Egan, Welch, Page & Sebastian, 1992; Ellis & Mathis, 1985; Hackman & Walker, 1990; Johnson, 1990; McCleary & Egan, 1989; Riffee, Kirk & Hudspeth, 1990; Souder, 1993).

In the Spring of 1993, twelve experienced telecourse students were convened by the Utah Education Network to consider the quality of their learning experiences; and, where possible, to make comparisons, draw conclusions, and point out implications, as well as contrast and correlate outcomes with a similar study conducted in 1992 with telecourse students. These students were randomly selected from a pool of 420 students. Each of the students had completed at least four telecourses offered through KULC, Utah's Learning Channel.

The present study was designed to provide precise and significant information for telecourse instructors, design personnel, and other support staff who are responsible for developing and improving telecourse offerings delivered through the Utah Education Network (UEN). The central focus of this study was to address the question, "What are the essential features of quality telecourses?"

Data Analysis

The analysis of the data for this study was completed in a sequence of steps beginning with the five investigators independently reading the focus group transcript and reviewing the video tape of the interview session. Each investigator coded students' responses using categories or themes that evolved during their analysis and, where applicable, cross-referenced them with the experiences and themes from the 1992 focus group. The five evaluators subsequently met to compare notes, discuss the development of themes, and clarify specific findings. Assignments were given to each investigator to further explore and focus on particularly-poignant student perspectives and attitudes under each identified theme. Final notes were then coalesced into a final report.

This paper provides information about the following themes: (1) what students like, (2) what students dislike, (3) characteristics of successful telecourse students, and (4) what students say about effective instruction. Additionally, implications for students, instructors, and administrators are identified.

What Students Like

Student participants praised the general convenience of telecourses, especially the accommodation for those students who work. Additionally, they enjoyed the flexibility and home learning environment that telecourses make possible.

Convenience

Most students agreed that the paramount benefit of enrolling in telecourses is convenience. They did not need to leave their homes to receive college courses that they required for professional advancement or pursuit of degrees.

Working Students

Students who want to continue working while still pursuing their education found the accessibility of telecourses to be advantageous.

> I work 40 hours a week and had to take off work hours for which I didn't get paid.... And I considered resigning and I thought do I have to lose my job to get a degree?' Compared to the daytime schedule, this is the only class alternative made for working students.

> I work full-time so it's nice to record the telecourse when I'm at work or at school during the day... I can record it and I can watch it later. I thought that that was very convenient.

> It takes time and money to come up here [campus] to classes and all the ones you need to take are in the morning. And you have to take time off work and it's just invaluable to me to have that at home...

Location and relaxation

Some students maintained that they enrolled in telecourses to enjoy the relaxed atmosphere of their homes and to avoid the disadvantages associated with traveling to campus.

> It tended to fit my lifestyle at the time when I was taking them. I guess one positive thing was -- I felt more comfortable. Like when I was going to class, I was more stressed out trying to get everything down. When I was watching a telecourse, no one's looking at me. I could have my pajamas on and be more relaxed...

> For me it was the convenience. You don't have to deal with the parking. You don't have to come up to the campus every day, and it's something once a week. You don't have to spend a lot of time in class. So, that's nice.

There were students, however, who found that a number of obstacles interfered with their "at home" learning experience.

> In a live class it's a bit more, you know, it's quiet. Depending where you're watching these things, I got kids running around banging things around once in a while. If I come up to the U and sit myself in a room and focus it's a lot better. But that's probably one drawback -- the environment in which you listen to it.

> I think the environment is important when you're talking about home. ... If you get up to answer the phone and miss like fifteen minutes of the program and come back, and you're lost. Or if somebody comes by...

Nevertheless, most students appreciated the convenience of telecourses. Working students particularly valued the flexibility afforded by telecourses.

Variety in Instruction

Students enjoyed the use of a variety of instructional approaches. These teaching approaches served to maintain attention, counteract boredom, and enhance student interest.

> That's what I like on telecourses when they do a little lecture and show us a clip of something and they go back to the lecture and it's not the same thing and you're not sitting just there ... watching something else, it wakes you up when they switch or something.
>
> ... instead of somebody getting up and just lecturing for two hours so that all you see is their face, or they're on a blackboard or have a movie screen to show clips of certain things... just so there's always something new going on because its hard to sit there and watch someone sit there, but if they're doing some different things and [using] different types of resources to pull from.

Reflecting on their experiences, students agreed that the convenience of telecourses generated opportunities to balance work demands with academic aspirations. Finally, they enjoyed those telecourses that employ a variety of approaches in delivering course content.

What Students Dislike

Throughout the focus group, students voiced concerns about specific elements of telecourses. First, students disliked telecourses in which instructors failed to utilize a variety of instructional approaches. Second, students felt isolated and discouraged when they were unable to communicate with instructors, teaching assistants, and other students. Finally, students expressed a need for regular review sessions, flexible exam dates and times which did not conflict with other telecourse offerings, and syllabi that clearly outlined exam dates and other important due dates for assignments.

Instructional Format

The "Talking Head"

Students expressed dislike for and frustration with telecourses that lacked variety. They valued telecourses that are lively, well paced and diverse in instructional approaches.

> I personally had a hard time concentrating as he would sit there and lecture for two hours or three hours or however long it was.
>
> I think all of them have that [variety] problem. How to make the class lively, ... it is a problem with telecourses. In live classes, at least, it is more interesting. You can get to ask your questions if you are bored.

The variety of instructional approaches used during each telecourse session appear to be directly related to the student attention and interest.

Accessibility And Isolation

Students found telecourses discouraging if they did not have opportunities to discuss questions with instructors, teaching assistants, or other students.

> That's one thing I find missing in the telecourses -- you can't have access to the teacher as often as you want. I mean, in a normal class, you can still critique or ask

> a question. On the telecourse, you can't even call during the class or after and ask a question because for the most part, the following week, the question is gone. I mean, that's the one thing that disturbs me.
>
> But at least you had access to the teacher and that makes it a lot easier. I think it is mandatory that they be specific in the television courses because you are so isolated and so much on your own, and you can get so misdirected with your own information, that you can get lost. And I really see it as an essential aspect to television courses.

Students enrolled in telecourses who were not able to communicate with instructors, teachers' assistants, or other students, expressed a sense of isolation. For some students, however, access and isolation were not an issue if other factors were present. These include well constructed syllabi, clear instructions, and specific information about assignments, exams, grading policies, and due dates.

Lack Of Coordination

According to students, the organization of telecourses is essential to the quality of the learning experience. They were unanimous in their criticism of poorly integrated learning activities and course materials.

> ... where the TV material is different from the book material and you ask, Why am I reading this? It doesn't relate. And then you have a question about what you need to know because you might have been told that you needed to read that chapter and to watch this program. Do you need to know all of it or do you need to know some of it? It's rare that you need to know all of it, because usually professors pick some from each. So then I would have more questions about what we needed to know.
>
> ... the review session started the same time that the exam was in another class. [Because] the television was on Wednesday night, but the review sessions were on Monday night... I didn't have time to go to all the review sessions and I had to miss a few of them ... it was tough when it was on a different day.
>
> The book and the TV ought to be intertwined and there ought to follow a certain structure with it so you know exactly where they're headed with it so you're not going in two different directions.

Anxiety regarding inconsistent scheduling of classes, review sessions, and exams makes for an aggravating experience, hence students asserted that instructors should provide carefully planned and orchestrated learning experiences which relate directly to the ways in which students will be evaluated through exams and other assignments.

Characteristics Of Successful Telecourse Students

As students talked about their learning experiences, they agreed that motivation and self-discipline are critical for successful learning through telecourses. Additionally, students suggested that time management and other personal organizational skills were essential to positive academic outcomes.

Motivation

Most students felt that telecourses required a greater degree of student motivation in keeping up with assignments and staying on task throughout the airing of the course.

Additionally, the social interaction that generally occurs between students and teachers was absent in the view of many telecourse students.

> I think, you have to be somewhat more motivated. It's like an independent type of deal too, from the study perspective, it's easy to drop off and get behind ...
>
> ...you have to be really highly motivated as far as keeping on task...but unless you're on top of it every minute... And that's harder when you don't have a teacher. A teacher could say, `Hey, you know, that paper's due tomorrow.' You've got to really be motivated. It's really hard to keep track of all of it.

Self-Discipline and Organizational Skills

Successful telecourse students appear to be self-disciplined and skilled in organizing their time. They often "push forward" in spite of problems with the telecourse content or format.

> [The telecourse] makes you schedule your time more, too.... And if you're going to record it you have to decide when you're going to watch it and when you're going to study it. So, it does make you schedule your time....
>
> I've had classes where it was a little bit hard to catch on...I didn't know what to study from so I had to push myself hard and it was tempting to skip the classes...there's no teacher watching you [in a telecourse] and it's easy to skip them, but then you just have to have the discipline to go in there and watch the shows and do the reading on your own. You know, it's a lot of discipline.

Lack of organization and self-discipline was viewed as a problem for some students who felt they learned more effectively in live classes.

> For me, maybe it's just my personality. I tend to learn more in live classes... I guess its just because I tend to blow it off a lot when it's televised. I don't read a lot. I guess I'm not motivated that way. Whereas, in live courses, it's demanding and you have it two or three times a week, and you're there and you can hand in homework assignments . . .

For highly motivated, working students who were able to organize their time well, telecourses appear to be a very viable option. As one student stated:

> But it really depends on the student's lifestyle if they could study at home and discipline themselves. It works just fine.

What Students Say About Effective Instruction

Students valued instruction that was directly related to exams, and other assignments which contribute to their final grades. They wanted to know specifically what they should be studying and how they should prepare for exams and other related assignments. Moreover, effective telecourse instructors engaged in certain behaviors and practices that positively impacted students' perceptions about their learning.

Learning Activities and Evaluation Outcomes

Focus group students said a great deal about instructors and their telecourse instruction. One of their greatest concerns centered on the relationship between instruction and course evaluation procedures. If students saw their viewing and studying as enabling them to perform well on tests and other evaluation measures, they were generally pleased with their instruction. On the other hand, if the instruction was vague and unrelated to examinations or evaluations, they were quite dissatisfied.

> And none of what was lectured on the television was even applied toward the test material... I felt really lost.
>
> When I would meet with that class at the scheduled times on the outline, it would be a totally different teacher and what was reviewed for study for the test would hardly even apply to the test.

Organization and Engagement

Course organization received considerable attention from students. They valued instructors who carefully structured their lectures and presentations. In addition to being organized, students appreciated instructors who were interesting, motivating, and engaging.

> I've taken seven of these and there's a definite difference in who's got their stuff together and who doesn't. As far as organizationally and how it's set up... they use a lot of visual aids and they're able to see exactly where they're headed. And there's no question as to what to study for.
>
> It's a great class to take on TV because it was well organized and you knew what you needed to know.

Syllabi and Learner Support Materials

Students discussed the importance of carefully constructed syllabi and the benefit of having other quality support materials.

> The teacher had printed up "Here's what you should have gotten..." And that was great [because] she wasn't on the TV saying it but it was in the syllabus. So I could refer to that. So that was really helpful.
>
> ... I went to take the exam and noticed the girl next to me was in a live class and I saw how much extra things that she had...I could have organized the material so much better if we had the advantage of getting the same material as they did through the [live] class.

Specific Instructor Behaviors

Students appreciated instructors who (a) were genuinely excited about their content; (b) used a variety of instructional approaches; (c) varied the ways in which they used their voices; (d) let their personalities show through; and (e) used movement appropriately.

Enthusiasm

I might not have been totally interested in government but he made you listen. And this guy was in love with what he was talking about.

> There was a definite, I think, desire on his part to make sure that you learned.... he is intrigued with it, he's gone around the corner, been around the block and now it's his turn to give out, you know.
>
> ... you can tell this guy is into his job, into politics and very emotional about it. You know, it makes it a whole different ball game.

Variety Of Instructional Approaches

> Instead of somebody getting up and just lecturing for two hours so that all you see is their face... Just so there's always something new going on because it's hard to sit there and watch someone sit there.
>
> That's what I like on telecourses when they do a little lecture and show us a clip of something and they go back to the lecture and it's not the same thing and you're not sitting just there...watching something else, it wakes you up when they switch or something.

Vocal Variety

> I took a core class... The instructor was very knowledgeable on that subject, but, you know, he just doesn't have the voice part -- he's very monotone. But on the other end of it, this [other] class, to me, was an older gentleman and the guy was really into it, you know, very emotional about a lot of things...

Reflection Of Personalities

> I think that, in addition to being very knowledgeable about the subject to being very specific, it would be nice if I could picture their own personality. Like with [an instructor], I knew his personality. He was just so fun to watch... And some other professors, it's been kind of like who is this person? I would have liked to know the personality a little bit better.

Movement

> They'd [the production staff] get him up and move him around, move him here and he'd go over there, sit down. You know, it was just like it was in his house.

Access to Instructors

Students felt they needed to have association to some degree with telecourse instructors. Additionally, they valued review sessions that directed their study and exam preparation efforts.

> The thing about teacher availability, I feel, like it's extremely important. Not only because it helps you to stay motivated, because you do have to be so self motivated in taking a class, [but] it also helps you to know that you're on the right direction in terms of what you are doing.
>
> ... that's your goal to get a good grade, you know. But if you're lost the whole time, you can't get to your goal. And that's frustrating.
>
> In the review session, they point out exactly what readings should have taken place, exactly what should have been studied, all of the telecourses -- what they were.
>
> ... I think the review sessions are really good. Like my sociology teacher took everything from the book and then from the PBS series and contrasted them in essays and that was what you were supposed to do. He told you what you were supposed to know and he brought the two together. Without that review session I would've done awful.

Students appreciated review sessions that were focused on clearly stated learning objectives and that correlated significantly with exams.

Implications And Summary

Students

Successful telecourse students must be highly motivated learners who are willing to give consistent effort and structure their use of time carefully. In addition, telecourse learners must be assertive and assume responsibility for obtaining the information they need in order to keep up with telecourse requirements and perform well.

Strategies for interacting with course instructors need to be available for telecourse students. While these strategies may take different forms, students' comments reflect a need for direct communication with instructors, teaching assistants, and other students.

While some students felt that watching telecourses in their homes was both convenient and comfortable, other students had problems with the informality and distractions of some home environments. Students need to be cognizant of how they learn most efficiently, and be prepared to structure their surroundings to facilitate successful learning.

Instructors

Many students watched telecourses at home and felt isolated. They expressed the need to have feedback where questions can be answered and concepts can be clarified.

Carefully constructed syllabi, study materials, focused lectures, and responsive discussions contribute to effective learning. Students expressed frustration when their efforts to achieve "good grades" were hindered by not knowing what instructors expected on assignments and exams. They valued enhanced, extended syllabi and other support materials that clarified the instructors' intentions and expectations.

Instructors need to employ a variety of approaches and media in their telecourses. These include but are not limited to video segments, case studies, computer graphics, debates, guest speakers, and simulations. There was general consensus that student attention was compromised when instructors failed to use a variety of approaches and media in making their content meaningful.

Administrators

Students identified several issues related to administering telecourses. They wanted greater access to video tapes of telecourse sessions through various sources (e.g., local libraries, community learning centers, etc.). In addition, they recommended that telecourses be rebroadcast at different times during the week to accommodate various work schedules.

Students want the scheduling of classes, review sessions and exams be coordinated with other telecourses. Additionally, they want these schedules clearly specified in telecourse syllabi.

The majority of students suggested that there be more kinds of telecourses. The request to increase the number and variety of telecourses may reflect the acceptance of the telecourse format as a viable instructional alternative to conventional university instruction. Students are looking for a broader range of telecourses that do not conflict with their work schedules.

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Problems And Issues In Distance Learning Using Interactive Video Between The U.S. And Selected African Countries

A Symposium

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Introduction

During the past several decades, higher education in the United States has been controlled by colleges and universities created to serve mostly a regional population. For example, in many states, if a post secondary institution proposed to offer a program or even a group of courses beyond the normal "region" of that institution (defined by some state-level board or similar entity), resistance was met by the other institution(s) in that geographic area where "turf" had been established. Although not always efficient nor functional in regard to quality, this model served the political needs of many higher educational organizations while reducing the accessibility of higher learning opportunities for many potential students.

With the recent growth and development of "distance learning", where courses can be literally "beamed" throughout the nation and even beyond, the possibilities of intercommunications and educational endeavors between organizations and institutions is becoming endless. Although many endeavors concentrate within the borders of a particular state or country, interest in transcending those borders is also growing.

As educators, we must realize that education cannot be defined nor "confined" as it has been in the past. In addition, as humans, we must also realize that whatever occurs in a remote city or rural area may affect us in many ways in the near or distant future. As the world becomes "smaller" through telecommunications, CNN, and related activities, we must work together between countries and cultures to develop what is becoming known as the "global village".

Therefore, "access" must be redefined. Even though new and very powerful technologies have emerged in the past decade, "bringing people closer together", educators have not really understood their potential until recently. In the April 6, 1993 issue of *Time* magazine, an article described the potential impact of telecommunications and related technology on society, but education was not even mentioned in the article.

Although educators were not in the forefront of this new technology, we are making great strides. We are finally realizing the potential of this powerful, multi-dimensional new technology which is challenging the traditional educational delivery system. Distance educators, with technological tools at their disposal, are beginning to utilize them to provide a variety of "access" options for students which traditional campuses cannot. Therefore, it is quite possible that we are on the verge of the most creative period in providing "educational access" in all of history.

The Mickey Leland Center for Distance Learning

In July, 1993, Representative Jack Fields (R., Texas) proposed to then Texas A&M University President Dr. William H. Mobley, that a Center for Distance Learning be created at the university to honor his late friend and Congressional mentor, Mickey Leland.

Mr. Leland had lost his life in an airplane crash while on a mission to investigate possible ways to alleviate the incidence of poverty, hunger, illiteracy, and their related correlates in Africa. The purpose of this Center would be the formation of collaborative activities with countries in East Africa where Congressman Leland had been concentrating his efforts to help citizens cope with the aforementioned problems. Congressman Fields was committed to finding the resources to fund a "pilot" project through his position as minority ranking member of the House Telecommunications Committee. Texas A&M University was selected as the representative institution in the U.S. because (1) Mr. Leland's widow, Alison Brisco, was appointed to the University System Board of Regents, and (2) the university is in the Congressional district of Mr. Fields.

The Africa Distance Learning Demonstration Project

To that end, in December, 1993, a team of educators from Texas A&M and Prairie View A&M Universities, and technology specialists from COMSAT Corporation, Inc., visited two countries in Africa - Kenya and Zimbabwe- to determine if interactive video transmissions between two continents was feasible for educational purposes. These two countries had been selected because of (1) the long standing relationship which Texas A&M University had maintained with Kenya through graduates and technical assistance missions, and (2) the interest in and knowledge about Zimbabwe contributed by Congressman Fields.

Based upon input from congressional representatives, researchers, and faculty knowledgeable about Africa, the team was selected to represent a set of content areas of which, four would be selected for development into two-hour broadcasts for the pilot project at a later date. It was recognized that a major part of the team's agenda was to (1) determine if the content offerings were appropriate for the needs of the populations in the two countries and if not, what would be more appropriate, and (2) determine if a distance learning project, via satellite, would be feasible for this effort. Thus, the project was launched with the team's departure on December 10, 1993.

Upon the team's return, four topics were selected for interactive transmission in a two-hour format to the two countries in April, 1994. Although this activity was deemed not only important, but quite feasible as well, there were many questions and issues which had to be discussed among all of the parties involved in order to develop the final interactive modules for broadcast.

Questions (and Related Issues)

Financial

What are the costs to be incurred in terms of required technology? How much time and effort will be required to develop the program and how will it be funded? What kinds of materials will be needed and how much will they cost? Who will provide the financing for the initial costs and the long-range costs? At what point does the endeavor become non-cost-effective?

Educational

Models of educational practice in the U.S. are not usually practical nor effective in developing nations. How does an individual discover what kinds of information are needed to determine what will or will not be of value, Or even wanted? Are there particular teaching strategies or methods which will be most appropriate? What kinds of facilities or equipment are available? How do we avoid offering "The American Dream" as is often feared by those in developing countries?

Cultural

What kinds of important questions are usually not anticipated in working with educators in other nations, particularly third-world countries? What kinds of "different" issues are sometimes forgotten in developing and offering educational programs, e.g., the role of the woman in the family, the importance of adults in comparison to the importance of children, the feeling about "getting ahead" in comparison to others in the community, etc. What changes in "thinking" are useful and how can they be acquired?

Technological

What kinds of technology are available? How are they used and for what purposes? How are issues of non-compatible technology (between the U.S. and other countries) resolved?

Political

What is the proper protocol in (1) contacting counterparts in other countries, (2) establishing face-to-face meetings, (3) resolving differences in planning and preparation, and (4) determining where the program will be located? What happens when participants want learning which may be "politically sensitive"?

Summary

Even though educators have begun to utilize the telecommunications technology to reduce the "access" problem faced by many adult students, its use on a much wider scope, particularly with international audiences, is still developing. Although there is more understanding about the issues of distance education in a "different" cultural environment, there is much more learning to occur before any of those questions and related issues can be addressed successfully. Hopefully, as funding and technology becomes available to transcend the "oceanic" barriers, many countries will be able to initiate programs to begin to meet all of our needs.

Understanding Students' Approach To Learning In University Traditional And Distance Education Courses

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Introduction

This paper presents a descriptive study of students' learning profiles at the university. The study addresses the question of how differently students learn in a face to face course and in a distance learning situation. For this purpose a Study Approach Questionnaire, Interview, and a Reading to Learn Activity were used with two groups of students at the Faculty of Letters and Philosophy at the National Autonomous University of Mexico.

The emphasis throughout has been to test methods which may reveal students learning profiles while improving their quality.

The Study

The distance learning system at the National University, Sistema de Universidad Abierta (SUA), has been operating since 1972. At present there are nine faculties that offer courses in co-ordination with SUA. The Modern Languages and Literature Department in the Faculty of Philosophy has achieved considerable success in the development of its courses at a distance. These courses follow the same curriculum as the studies offered in regular lecture courses in the Faculty (FAC). However, students in SUA attend only to a two hour seminar every week and a full teaching day every six weeks.

As with other departments working in SUA, the Literature Department concentrates its efforts in the definition of the course objectives, and the development of teaching materials. In addition to this, the department gives special emphasis to the coordinated action of the tutors among themselves and their relationship with the students. Staff meetings have the double purpose of organizing the tutors' activities and of discussing ways in which they can update and improve their role as tutors.

Although there seems to be a general acknowledgment of the differences between students in SUA and those in the regular course, FAC, there is no systematic attempt to describe such differences in terms of students' learning. The present study is an effort towards a qualitative profile of students' learning in both populations.

The Design

The general aim of this study is to describe differences in students' approaches to learning and how these relate to a sample of their learning activities. Such a description will result in a qualitative profile of the chosen student population which may complement quantitative information when decision on changes on the curriculum are made.

Relevant points of departure for this project have been the studies that reveal the importance of qualitative aspects of students' learning and the value of understanding `how' students learn rather than how much they achieve (Marton and Saljo, 1976, 1981; Thomas and Harri- Augstein, 1985).

The two main questions with which this project is concerned are as follows:

- What relations exist between students' approaches and personal views on learning and a sample of their learning activities ?

- In what ways do students from one population (Distance learning, SUA) differ from the other (Face -to- face lecture course, FAC) ?

The design of the project includes the use of three measuring techniques: a study approach questionnaire, an interview, and a reading activity. These techniques were applied in the order stated to obtain a profile of the population ranging from general to specific aspects of student learning.

The Questionnaire

The Questionnaire was based on the Lancaster Inventory of approaches to study (Entwistle, Hanley and Hounsel, 1979). The number of questions was reduced but the main categories in the original version were maintained. (Educational orientation, Motivation, Learning approach, and Study Approach). The categories in this questionnaire are an attempt to integrate different studies in students' learning styles and approaches to studying, mainly those of Pask, 1976, Marton and Saljo, 1976, and Entwistle, 1979. (See items in Fig. 1)

The use of the questionnaire is to be interpreted as a way of systematically looking at students' attitudes to learning in order to make these more accessible to analysis, and not as a way of assigning fixed traits to individuals or groups.

The Interview

The content of the interview was based mainly on the work of Marton, 1976. The purpose of the interview is to find out to what extent learning can be a subject of analysis and reflection for some students and to what extent its meaning is taken for granted by others. The interview consists of eight questions. The first four questions are related to the students' perceptions of their educational environment; courses, teaching, staff and evaluations. The last four concentrate on learning as it is experienced by students themselves and as it is perceived in others.

Interview

1. How would you describe your relationship with the faculty (lecturers and tutors)?

2. What is your opinion about the way the University is organized (programs, courses, exams, teaching) ?

3. What do you think about the evaluation system at the university ?

4. How important are grades for you ?

5. Why do you think some people are better at learning than others?

6. What does learning mean to you?

7. How would you explain quantity and quality in learning?

8. How would you describe your own style of learning?

The Reading Activity.

The reading record is an activity based on the work of the Center for the Study of human Learning, CSHL, (Thomas and Harri-Augstein, 1985). The basic idea behind the technique is that reading for learning is a process of meaning attribution, construction and reconstruction of the contents of the text.

The CSHL has developed more accurate methods for obtaining such records. The Reading Recorder and the Computer Interactive reading programs are examples of these. However, for reasons of availability, a paper and pencil version of this technique was used in this project, Figure 2.

The main purpose in obtaining these records was to have a sample of students' learning. To achieve this, the activity was designed in such a way as to meet the following criteria:

- In terms of content, it should resemble as much as possible the type of texts that students read in their literature courses. A text by the writer J. L. Borges on Nathaniel Hawthorne was selected. This is a literary essay, the level of difficulty of which was not too simple for those in the third and fourth years. The text was selected with the help of some tutors and the choice was made on the basis of their agreement on the level of difficulty and relevance of the text.
- In terms of process, the activity should simulate what students do when learning from written materials.
- In terms of demands, it should make demands on the students at the level that is required in a university course. A set of questions was designed to obtain a record of students comprehension of the text. Again, the tutors participated in the formulation of the questions and provided an agreed version of the answers to the questions. Figure 3

The Sample

The sample consisted of two groups of twenty students each, one belonging to the distance system, SUA, and the other to the regular courses in the Faculty, FAC. The age range in the SUA group was 19- 32 ; that in the FAC group was 18- 26. All students were attending courses in the Modern Languages and Literature Department. Students participating in this project ranged from the second to fourth year and they participated on a voluntary basis. A brief written summary of the project was presented to both teaching staff and students. The teachers were rather sympathetic with the project, and this helped to encourage students voluntary participation.

Data Collection

The administration of the questionnaire was carried out in small groups of three and four students, and occasionally with individuals. The time allowed to answer the questionnaire was thirty minutes, but the average time taken by the students was twenty minutes.

The interviews were carried out individually with the exception of a group of three students who were interviewed at the same time, but nonetheless they each answered the questions individually. The interviews lasted from thirty to forty five minutes, and students could expand as much as they wished on their answers. All of these sessions were tape recorded. The schedules offered for the interview were rather flexible, and this helped to facilitate a more relaxed atmosphere, often at the students' home, in which to carry out these sessions.

For the reading activity, students were approached individually. They were given a familiarization exercise which enable them what to expect and what to do when the reading record technique was applied. Some students found that the technique was rather disruptive of the way they normally read. They were encouraged to use the technique on several other texts before the text on Borges was given.

Analysis

The Questionnaire

Personal construct psychology leads us to be rather wary of taking the responses to questionnaires as objective measures of attitudes. Firstly, the wording of any item will almost certainly be interpreted differently (that is, it will have different personal meaning attributed to it) by different respondents. Secondly, the personal meaning of each item is achieved relatively (that is, in the context of all the other items in the questionnaire). The 'results' from the two groups were therefore analyzed not absolutely in terms of the individual responses, but as regards how the cluster linkages among items varied between the two groups.

The Interview

The Interview presented the problem of processing open ended answers. The analysis of the information was approached as follows: students answers to one question were grouped according to a similar criterion, and a superordinate category name was assigned to each coded cluster attempting to reflect the commonality in all answers. For example, question number 6 "why are some people better at learning? elicited responses such as' it has to do with the family background, the schools you attended', "it is related to his social economic position: if you belong to a large family, if you work, if you are badly nourished', `if you do not have the means to go to a private institute to learn English'. All these answers were grouped under the category `identify causes in external, socio-economical factors'. This way of organizing information allowed the results to be structured to a certain degree without loosing the variety of responses the students gave.

The Reading Record

The text was a ten page essay, and it was numbered every fifth line. A record was taken on the basis of the students, markings on the right hand side of the text. The simple version of the technique used in this project does not allow for an accurate measure of time, a factor that has been standardized in the forms used.

The students records were analyzed according to these criteria;

- the pattern of reading, the read record.
- the number of responses which correctly answer the question

The reference for marking the correctness of students answers was an agreed version elaborated by the tutors and validated by other two external lecturers in Literature.

Results And General Considerations

The Questionnaire

Figure 1 shows simplified correlation matrices for the two groups. Correlations below 0.7 are omitted and the items are reordered to highlight the cluster linkages. General clustering reveals at least four main areas of interest in the students responses:

1. Students in the distance learning courses have a more differentiated view than those on the traditional lecture course.

2. Distance students relate personal learning (items 27, 25 and other associated items) to students independence and responsibility (items 28 and 26) whereas FAC students view these as separate entities.

3. FAC students associate items 5,6,8,9,10 , 18 and 19 together showing the importance of grades and the emphasis on the pragmatic aspects of their learning.

4. Students in the distance learning courses tend to read beyond the school requirements.

Interview

Coding of responses to the eight topics raised in the interview again shows some differences between the groups. Figure 4 shows tables for each of the eight topics. The participants in SUA generally take a more positive stance than those pursuing the traditional lecture courses. This is consistently revealed in most of the responses to the interview, but particularly in the relationship with the faculty and evaluation. Furthermore, in the last two items of the interview, the students in SUA reveal a more personal, and meaning oriented approach to learning whereas the students in the FAC tend to view learning from a more instrumental perspective.

The Reading Record

As it is shown in Figure 5 the SUA students scored slightly higher than the students in regular lecture courses. However, there did not seem to be significant differences on the reading records patterns. A secondary but important result in applying this techniques is that students became involved in the nature of their process of reading, and in the ways this activity reflected those.

General Considerations

The size of the group samples does not allow for definite and broad generalizations. However, it is important to notice the tendencies shown in students' answers:

The findings revealed that the students in distance courses were more interested in their own learning, and value, though critically, the role of the tutors and the system of education in the University as a whole. Whereas the students in the regular courses showed a less involvement and more negative attitudes as regards the context in which their learning occur . Also, the SUA students seem to consider learning more as a personal experience than as a school requisite. The FAC students revealed more utilitarian and applied orientation towards learning. As regards their reading achievement, there were not significant differences between the two groups.

The study revealed the importance and methodological difficulty to analyze qualitative data, an indispensable ingredient in the study of human learning. The techniques used in the study proved to be useful for this purpose; particularly in the way they preserve the richness and uniqueness of individual answers and at the same time allow to compare the populations as groups. However, further refinement is needed in the way the results are analyzed which in turn may enforce wider and more accurate interpretations.

Finally, it is important to mention that students in both populations reacted extremely positive to the fact that they were approached individually. Also, that their interest and involvement with some of the techniques, particularly the reading record, went beyond the scope of the study and they continued using and applying the technique to suit other learning objectives.

Figure 1. A COMPARISON OF PATTERNS OF QUESTIONNAIRE RESPONSES FOR TWO GROUPS OF MEXICAN STUDENTS

QUESTIONNAIRE ITEMS

QUESTIONNAIRE ITEMS	16	1	27	25	3	2	15	22	28	26	14	21	13	17	4	11	23	6	5	10	9	8	20	12	18	19	7	24		
16		8	8	7		7		8	7	7																			16	In a critical work I carefully analyse the evidence to evaluate conclusions
1		8	6	7		7		8	7	7																			1	I want to learn more about what interests me personally
27	7			9	7	8	7	8			8																		27	I must accept something before I take it as a valid irrespective of source
25	7		9		7	8	7	8		7	7	7									FFy								25	One main interest is to develop my own philosopy and act accordingly
3						7		7							7														3	Ideas in books I often associate with personal experience related to my course
2			7	7			7		8	7	7																		2	I think I can perform efficiently on these courses in spite of my other occupations
15																													15	I like competition, it is intellectually stimulating
22	7		8	7	7	7			8	7																			22	I usually analyse critically the ideas in course, tutorials and books
28	8		9	9		8		7																					28	Students should not take the contents and presentation of a course for granted
26	6		9	9		6		8	9		7																		26	Students should participate more actively and responsively in organisation of course
14			8	7	7			7	8	7		7																	14	I find ideas in courses which I continue to study after the course
21														8				7	7										21	Exams and deadlines make me anxious
13										7				7															13	I often question the meaning and value of what I am doing
17			7	7				7		8			8																17	I postpone doing assigments and get overloaded at end of term
4					7																7	7							4	I try to give a good impression to my teachers and classmates
11																	7												11	It is important for me to do better than my classmates
23																	7	7	7										23	I try to give a good impression to my teachers and classmates
6																				8	8								6	It is important for me to do better than my classmates
5			7				SUA								7	7	7			8									5	I constantly look for clues to exams, etc. in tutorial and lectures
10																	7		7		7	7		7					10	I often look for likely exam questions when I am reading
9																							7	8	7	7			9	I prefer well known methods than trying something new
8																			7				7		7	7			8	My main concern is to get a pass grade rather than interest
20														7								7							20	The continuation of my university course 'just happened', was not planned
12																									6	7	7		12	I like detailed instructions about how to tackle assignments
18																													18	My main reason for studying is to get a good job
19			7	7						7																			19	I prefer to learn facts rather than consider theoretical issues
7																													7	I prefer to be imaginative rather than pursue the 'right' answer
24																				7				7	7				24	I seldom read books not included in my courses
	16	1	27	28	3	2	15	22	26	26	14	21	13	17	4	11	23	6	5	10	9	8	20	12	18	19	7	24		

KEY 1. (7, 8 AND 9 SHOW HIGH CORRELATIONS (+10) BETWEEN ITEMS

Figure 2. **The Reading Record**

This activity will show you how you can make a record of your own reading. To do this you will have to familiarize yourself with some symbols.

| **Linear reading**

¦ **Pause**

N **Note taking**

U **Re reading a previous part of the text**

O **Skip some parts of the text**

Now, we will apply the technique using these symbols. Take a pencil and mark the text on the right margin as you read.

Try to be aware of your eye movements as you progress in the text. if you make a pause, signal this with the symbol [¦]; if you take notes, write [N] . if you search the text backwards write [U] . If you omit reading some parts of the text [O], and if you make a continuous reading write [|].

You may find that the first time you use this technique, itis difficult to read at the same pace you are used to. However, once you practice with it several times, it will become more natural. You may practice the activity with other texts before we apply it to the Borges reading.

Figure 3. **Text: Borges, J.L> "Nathanield Hawthorne" en** <u>**Otras Inquisiciones**</u>. **Mexico, 1980. Siglo XXI.**

Before reading the text: read the following questions

While reading the text: take a record of your reading

After reading the text: answer the questions

Questions:

1. According to Borges, which is the relationship between literature and dreams ?
2. Borges considers that there are two types of writers: those who think with images, and those who think with abstractions. To which of these categories does Hawthorne belong ?
3. Why does Borges think that Hawthorne' s short stories are better than his novels ?
4. How does Borges interpret the maxims Hawthorne uses in his short stories ?
5. In what ways "Wakefield" precedes the themes in Kafka ?
6. How does Borges interpret the relationship between Marlowe and Shakespeare; Hawthorne and Kafka ?
7. How does Borges differentiates the short stories from the novels ?
8. Why does Borges think it is important to include in this essay extensive passages from Hawthorne's biography ?
9. Why is the word `allegory' important in this essay on Hawthorne ?
10. Why Borges considers that the theory that compares literature with dream inventions cannot be applied to literary texts in Spanish ?

Figure 4. Tables of Interview Results

Relationships with teachers	SUAF	FAC
It is positive, they are helpful and understanding	9	-
It is a good relationship. Teachers are well qualified	4	-
Good. But there are problems with the personalities of some tutors	5	2
It is a good relationship	2	7
It depends upon the type of teacher and type of student	-	4
It is a very tense relationship	-	7

The university teaching system	SUA	FAC
It is a very good system	8	-
It works. It is efficient and it is well organised	5	-
It is a good system. It gives you freedom and demands responsibility	3	-
It is good, but it has some weaknesses	4	4
I do not think it is adequate	-	4
The courses are well planned but the teachers are not very good	-	6
There are problems with the organisation of the contents	-	6

Evaluation	SUA	FAC
Fairly adequate, fails to give feedback to students	4	-
I contrast my view of the quality of my work with that of the teachers	3	
It is adequate. Teachers know how to do it	9	5
It is not very good. Lacks objective criteria	4	4
It is inadequate	-	3
Some aspects of it should be changed	-	8

The importance of GRADES	SUAF	FAC
They are important. I set out good marks as my objective	7	-
They are important. They reflect how much I have learned	5	-
They are not important. Their value is often arbitrary	8	5
They are not a good representation of the students knowledge	-	4
They are important for future plans	-	5
The relate to students progress	-	6

Reasons why some people are better than others at learning	SUA	FAC
It is related to motivation and to having a personal interest in what you are studying	9	-
It depends on the background knowledge that the student brings to the course	4	-
It is related to creativity and perceptual sensitivity	3	-
The causes are to be found in external factors	4	6
Defects stem from a lack of previous knowledge and training	-	3
Defects stem from a lack of method, techniques and study skills	-	5
The educational environments do not help students' learning	-	6

What does 'learning' mean	SUA	FAC
Learning is to modify certain behaviour	3	-
I know I haver learned something when my views coincide with others'	3	-
Learning is something that relates to memory	3	-
Learning is an increase in knowledge	3	3
Learning is considered to be a personally meaningful experience	8	8
Learning is related to practical experience and application	-	9

Views about the quality and/or quantity of learning	SUA	FAC
Quality and quantity go together. When you learn better you learn more, not vice vers	5	-
The freedom is distance learning systems helps improve the quality	3	-
Everybody should try to learn better. They should study more	3	-
Quality in learning is identified with personal and meaningful experiences	5	4
It is good to have both types	2	2
Quantity refers to numbers and facts. Quality refers to how much you understand	2	9
Quality in learning is related to the application of knowledge	-	5

Style of learning	SUA	FAC
It is personal, apparently disorganised, intuitive but coherent	6	-
I have difficulties in learning	4	-
I learn by association	5	4
I organise my work according to the task	5	6
It is a question of trial and error	-	5
I base my learning on what I get from classes and my teachers	-	5

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Figure 5. **Results of Reading Activity.**

	A Content Questions					B Reading Records				
	1	2	3	4	5	1	2	3	4	5
SUA	7	9	1	3	0	3	6	3	4	4
FAC	4	8	2	4	2	3	3	5	5	4

A. Correct answers. Highest score No. 1 - Lowest score No. 5

B. Reading Records. Complex, detailed reading No. 1 - Linear, less elaborated reading No. 5

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Academic Self-Concept: Its Nature And Importance In Distance Education

(Research in progress)

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Introduction

Persistence continues to be a concern among distance educators and administrators alike. One concrete example of this concern is the continuing number of research studies related to this phenomenon (see for example, a review by Cookson, 1990). The primary focus of these studies is the identification of influences on learners' decisions to leave distance education courses of study before they are completed (attrition). One construct which appears influential on continued participation in distance education is the adult's academic self concept.

In response to practitioner interest in persistence, a number of models have emerged to explain and predict attrition. Similar to the models of participation in formal learning activities which have been developed in the field of adult education (Boshier, 1973; Rubenson, 1977, Cross, 1981, Cookson, 1986), the models of distance education persistence and attrition posit an interaction between the individual and his or her environment. These models include not only those characteristics students bring to the educational process at the time of entry, such as educational preparation, motivational and persistence attributes, and educational preparation (Kennedy and Powell, 1976; Sweet, 1986; Billings, 1988). They also include variables that are more situational in nature. These include the learner's life situation, such as family and employer support for studies and changes in life circumstances (Powell, Conway and Ross, 1990; Pythian and Clements, 1982, Woodley and McIntosh, 1980) and factors related to the educational institution, such as quality and difficulty of instructional materials and provision of tutorial support (Billings, 1988; Sweet, 1986; Kennedy and Powell, 1976).

One construct that emerges in a number of persistence studies in both adult education and distance education pertains to the adult's perception of his/her ability to succeed in the educational environment. For example, Garrison (1985) studied whether goal clarity and course relevance variables would provide greater discrimination between persisters and nonpersisters in an adult basic education class than would other psychosocial variables. He concluded that after the variables of last grade completed and hours worked entered the discriminant analysis, a ideal self/self confidence discrepancy variable was the most powerful discriminator.

Similarly, in a post hoc study of adults pursuing baccalaureate degrees at a distance, measures of expectancy of success in learning activities, as well as both dispositional (related to one's attitude and perceptions about self as learner) and independent study (related to the process of studying at a distance) variables were associated with persistence (Gibson and Graff, 1992). They highlighted the importance of a learner's overall expectance of success and the predictive potential of this variable. Approximately 69% of degree completers and 60% of noncompleters studying in external degree programs were correctly classified using this variable alone increasing to 78.3% and 70.0% respectively with learning style, dispositional and independent study barrier subscales added.) The findings of Powell, Conway and Ross (1990) closely parallel the Gibson and Graff (1992) findings with students' perception of their chances for success, value of previous education, concrete study habits, persistent behaviors and need for support included in a discriminant model. This discriminant model correctly classified 69% of the respondents in terms of their success on their first course in their baccalaureate degree at a distance.

The adult's concept of self as learner has also been associated with success in a graduate distance education degree program (Langenbach and Korhonen, 1988). However, in contrast to the above studies, the researchers noted that a more positive sense of self as learner was associated with noncompleters. These findings are similar to those of Garrison (1987) who concluded that higher levels of self confidence in one's ability to learn were associated with dropouts. Garrison suggested that perhaps dropouts have a false sense of self confidence as they begin their studies, a suggestion echoed by Langenbach and Korhonen (1988). It should be noted that in both cases, the measurement of the learner's perception of self as learner preceded the beginning of study, in contrast to the post hoc measurement in the Gibson and Graff (1992) study. Garrison (1985) assessed learners at the beginning of the study. However, these students were considerably younger and had been out of school many fewer years (2-3) than those other studies, perhaps leading to a more realistic self assessment of learning abilities.

Timing the measurement of one's perception of self as learner may be critical for another reason. As Herrmann (1988) notes,

> a cursory investigation into research in distance education...shows that, for the most part, students are treated as a sample population with group characteristics, i.e. flat, unchanging individuals. (p. 5)

The previously mentioned studies fit this mold. However, Herrmann's own recent research on secondary socialization of distance education students illustrates the changing perceptions of these students as they progress through their studies and the situational adjustments which are made as they juggle their multiple roles. This calls into question the "flat unchanging" conception of individuals. A possible conclusion, considering this and other research, is that students' conceptions of themselves as learners are important to their success. Further, this facet of self-concept is potentially dynamic and ever changing throughout their studies, affected by their interaction with their environment.

This study was an effort to gain a better understanding of the nature of the distance learners' academic self concept, its stability and/or changeability, and, if changing, the precursors and/or catalysts of these changes during the early months of distance study. Academic self concept one of a number of facets (physical, social, emotional) which make up one's general self concept (Shavelson, Hubner and Stanton, 1976). Essentially, it represents the learner's mental image of self as learner: the sense of personal competence and related confidence in their abilities to succeed in the chosen educational endeavor. This study's methodology is mindful of Woodley and Parlett's (1983) call to complement system-wide studies which look for general trends, patterns, and explanatory models with more detailed micro-analyses at the "individual student level (where) we need to know far more about the psychological processes involved in becoming and ceasing to be (a student at a distance)" (p. 19).

Methodology

Sixteen external degree students were interviewed seven times during their first year of study at a distance. These baccalaureate degree seekers were predominately female (87.5%) between the ages of thirty to forty-two, and employed outside the home a minimum of 50% time. All had one or more dependents. The subjects were self-selected. Sixteen individuals from a total group of 29 matriculating students in the two month registration period selected as the starting point for the study, expressed a willingness to be interviewed when asked. When participants and a sample of non-participants were compared, they were found to be similar in age and gender distribution, past educational experience, and other demographic characteristics, such as marital and socioeconomic status.

Open-ended interviews, ranging in length from fifteen to forty-five minutes, were conducted each month for three months following the student's initial matriculation into the program, then every six to seven weeks in the succeeding eight months with the timing dependent on holidays, student life roles and responsibilities, etc. The focus of the interviews was on the experience of studying at a distance generally and, more specifically, on variables as perceived confidence, perceived competence, commitment, barriers and enhancers to progress in their studies, and breadth of resources used in pursuing their studies. Each of the telephone interviews was transcribed verbatim into the computer. Reviews of field notes and transcribed data permitted increased focus on certain areas in the later interviews and provided opportunities to pursue a more indepth understanding of certain themes, as well as triangulation of data.

The data were reviewed for utterances that related to the general concept of academic self-concept. Further analysis of these data revealed recurring topics and patterns which formed the coding categories for data analyses and interpretation. Data interpretations were shared with students who had pursued studies at a distance (as well as a group of international distance education colleagues) for further feedback, insights, and comment.

Through successive data analyses, academic self concept emerged as an important and dynamic construct. This construct reflected the student's abilities to function successfully within the content and the context of study at a distance from peers, educators and the educational institution. This article focuses solely on the data collected during the first three months of study and on the construct of academic self-concept as it relates to the student's ability to pursue a degree at a distance. This initial three month period was selected because this is the period during which attrition is particularly prevalent (McIntosh et. al. 1980; Woodley and Parlett, 1983; Billings, 1986; Cookson, 1990).

Academic Self Concept - A Dynamic And Multifaceted Construct

Analysis of the data from the first three sets of interviews, covering the first four months of formal study, clearly illustrates the dynamic nature of one's self concept as a learner. For example, one student, reflecting on her level of confidence entering the program and her level after completion of several course requirements, noted,

> Getting back and doing a few things and finding out...that I'm not going to fail. I don't think it's going to be a problem getting through it as far as learning on my own. From that point of view ...I feel a lot more confident.

On a less positive note, and illustrating the fact that some students may enter distance education programs with an inflated sense of their abilities and commitment to learn at a distance, another student bemoaned,

> Once I looked at the course material for geography and once I started this whole thing of realizing how much time I was willing to commit to it, I went from being fully confident [10] to where I am now [6].

When considering themselves as learners, students appeared to be thinking of several areas of competence. Some commented on their ability to cope with the process of learning as an adult,

> I thought that my weakness would be that at 41 maybe my retention power wouldn't be a great as it was... my last college days,

Others focused more specifically on their new roles as learners at a distance,

> I quickly realized it was going to be a lot harder than I anticipated, so I went to an easier course...so that I would gain some confidence in this whole way of learning.

Still others commented on their confidence relative to a body of content. For example when asked directly about her level of confidence, one student said, "once, I get over the math class, pretty good!." On a more positive note, another student quipped, "I was surprised at how much I actually did know, did remember from years before!" as she reflected on her subject matter competence in a specific course.

It's interesting to note that students reported a strong sense of self, belief in their abilities and pride in their accomplishments in their roles such as workers, community leaders, parents; often in stark contrast to their early perceptions of themselves as learners.

Enhancers And Detractors Of Academic Self-Confidence

Whatever the nature (valence, level and foci) of the student's academic self-concept, there appear to be both enhancers and detractors to their perception of self as learner at a distance. Many of these enhancers or detractors are environmental in origin and most are institutionally-oriented.

Process related factors affecting academic self concept.

A variety of confidence enhancers were mentioned in the interviews as students reflected on the process of learning at a distance. Empathy on the part of the professors was noted as an enhancer,

> my confidence has been enhanced because the professors are so accommodating ... in this situation. The thing that is so wonderful is that they respect the position I'm in (as a working parent.)

Personal success also appeared to play a large role in bolstering confidence and commitment as evidenced by such expressions as,

> I feel like I'm absorbing all this stuff real well. I don't feel lost at all, you know, cause that would make me give up.

as did progress toward a larger educational goal,

> If anything I have been studying more now that I'm getting near the end of the course cause I feel so good that... Hey, I think I've actually tackled one (course).

Another student suggested, "The more you do the easier it gets." Yet another noted,

> I feel more competent in the sense that I'm getting to know what to expect cause when you first go in... nobody really talks to you and says well maybe you should do this, this, and this.

echoing the common refrain that familiarity with the process of learning at a distance enhances one's competence and confidence, albeit from some students' perspective, as a result of trial and error. Self-growth also appeared to be an enhancer as exemplified by this statement,

> Sitting down and having to feel that I am actively pursuing (knowledge) and kind of pushing out my boundaries and becoming...You can't but be a better person for it. And I actually enjoy that and ...that feeds your self-confidence, self-esteem.

What appears to emerge is a sense of accomplishment and a concomitant growing respect for one's self as learner. Empathetic faculty who appear to respect the learner, their circumstances, and their efforts also contribute to this growth in academic self concept.

On the flip side of the coin, we hear students express a lack of confidence in themselves due to their lack of familiarity with the process and related roles in distance learning, with its separation of teacher and learner, increased learner responsibility and autonomy. For example, one student noted, "...maybe after I finish a couple of courses I'll be more confident and ... know what to do in certain situations." In a somewhat related concern, reflecting on an ideal behavior yet to be achieved, another student noted,

> Like if I'm having a problem...not even think twice about calling up an instructor and asking them. Right now, it's kind of like, well gees, I don't want to bother them.

Skills deficiencies also seemed related to levels of confidence. One student questioned her ability to learn and attributed this lack of confidence as follows, "Part of it is having really rusty study skills. Part of it is never having had study skills." Another noted, "I don't know if I can read well enough, although I have no trouble reading." Perhaps she reflected a need to identify some source for lack of confidence in her ability to succeed in the heavily print-based academic program in which she was enrolled.

Students' confidence in their ability to successfully complete a degree seemed directly related to their ability to juggle multiple roles, such as "trying to balance the stress of still getting my job done and coming home and studying." and "juggling time a little better." As one student reflected on her struggles to balance commitment to personal life with commitment to learning

> My biggest weakness is time. Wanting to maintain my personal life and my interests and activities and yet realizing that if I'm seriously going to get through this coursework...I have to work at this every, at least every day.

Thus, students expressed concerns about their ability to cope with a new process of learning. Included were concerns about their entering study skills and reading competencies, and their ability to assume the new roles and responsibilities needed to succeed when learning at a distance.

Content Related Factors Affecting Academic Self Concept

Students also reflected on mastering a variety of content. As they did so, they mentioned enhancers of academic self-concept such as a new awareness of prior knowledge as exemplified by the comment "I knew more than I thought I would know." after successfully taking a number of placement examinations. Realization by some adult learners that their accumulated experience base was relevant also appeared to enhance confidence, as exemplified by the following,

> After...taking two exams that I took, I realize that I do know something. I'm not just picking it up right now. It's relating back to my present occupation and I'm very confident now...everything isn't totally new. So the life experience that I had so far is helping.

On probing why a student felt her confidence level was higher now than in the prior month, she noted,

> The fact that I'm actually doing it as opposed to thinking about it (pursuing the degree). That I'm getting good feedback and some good grades and I'm accomplishing what I set out to do.

It appears that success in mastering content enhances confidence. Related to that success is a familiarity with instructor expectations for testing and grading, for example,

> Now that I've done a few assignments and taken a few tests in my two courses I have a better idea of what they want and I feel more confident that I can do the work.

Thus students recognize the relevance of prior knowledge and experience which emerges as an enhancer of academic self concept. This relates, in part, to yet another enhancer, which is an increased understanding of expectations leading to success in educational pursuits.

But the opposite side exists here too. Many students who were interviewed mentioned the same factors as detractors to their academic self concept as they pursued their coursework. Many of these detractors related to expectations regarding assignments, test taking, and test types. For example,

> I think my biggest challenge was talking, having that initial conference, with the instructors and finding out what they expected of me.

One student noted, "I try to look at instructions and do what they say verbatim," but, she continued discouragingly, "Sometimes you get off on a course (direction) that you think is appropriate but it really isn't ..." Some students even lacked sufficient confidence in their ability to 'psych out the instructor' regarding what he/she wanted. They were reluctant to send in any assignments for fear they guessed wrong. One student noted,

> So I know I need to send it (the completed assignment), just go ahead and do it, send it. Because if it isn't what they want they can let me know.

Also, students expressed diminished confidence in their academic abilities as they confronted a dreaded course. For example, "I'm pretty confident. I mean I'm still scared about the Logo one (computer course on LogoWriter)..." or an unfamiliar exam format, for example, "I've never taken an oral exam before. I don't know what to expect." A student who was doing well and getting A's noted, "But, it's like I want to know why I got an A." expressing a need for feedback, insights into evaluation criteria and perhaps data upon which to make an appropriate judgment on how confident she should be!

Registering for too many courses, then failing to make adequate progress also appears to be a detractor. Reflecting on her waning commitment to learning and seeking a boost, a student commented, "I was going to call my adviser this week ... to ask what happens if, having bitten off 12 credits and wondering if I could finish it all in a year." Summing up what she believed to be the crux of the problem, one student lamented, "There's no network of support here."

A lack of understanding expectations coupled with a reluctance to call instructors for the necessary clarifications appeared to diminish academic self concept which further delayed progress toward degree completion, because students were hesitant to mail in completed assignments. This delay lowered academic self concept further because previously established academic goals (such as the completion of a specific number of credits within a year's learning contract) became increasingly difficult to accomplish.

Discussion

As noted earlier, a student's academic self concept appeared to be an important construct when considering the problem of persistence in distance education (Gibson, 1992; Powell, Conway and Christopher, 1990; Langenbach & Korhonen, 1988; Garrison, 1985 & 1987; and Kennedy and Powell, 1976). Herrmann (1988) suggested that students change their perceptions of self and of their studies as they progress toward their educational goals. Thus, it seemed important to have a better understanding of the nature of academic self concept and influences on this facet of self concept. As Wlodkowski (1985) noted, educators have the opportunity "within our special instructional or training session to positively affect that person's self-estimation." (p. 89)

Herrmann (1988) concluded, for example, that students' purposes for studying at entry changed as they continued their studies, reflecting a dynamic educational purpose. Similarly, findings from this study helped clarify a dynamic academic self-concept. Students varied along a continuum from positive to negative and their academic self concept changed as they progressed in their studies. Further, academic self concept was multi-faceted, related to both the process and the content of learning within the larger context of learning at a distance. Most importantly, academic self concept appeared to be a situational attribute of the learner with specific institutional factors, (such as educational processes, faculty expectations and specific course experiences) which emerged as influences. As noted earlier, students reported a strong sense of self and pride in accomplishments in other venues not always seen in their conception of themselves as learners.

These general findings are supportive of Shavelson, Hubner and Stanton's (1976) conception of a multifaceted self concept which differentiates academic from nonacademic self concept. However, this study specifies the existence of facets within academic self-concept as suggested by Shavelson, Hubner and Stanton (1976). More specifically, in addition to a subject matter facet they suggest exists within academic self concept, this study shows that there are one or more facets related to the process of learning in general and distance learning specifically.

Several of the study's findings are supportive of earlier research on adult students studying in traditional educational circumstances. Examples include their frequently expressed concerns regarding their abilities: to learn at their age (Flannery and Apps, 1987); to juggle their multiple roles of worker, parent, community member, student, significant other (Slotnick, et. al. 1993); and to find the time for their studies (Mischler and Sewell, 1982). Such concerns sometimes undermined their academic self concept. Adding the distinctive process of learning at a distance appears to add yet another challenge to being an adult student.

This is not to say that all students have a somewhat negative educational self concept initially. Parallel to the findings of Langenbach and Korhonen (1988) and Garrison (1987), several students demonstrated the "bluster syndrome - a propensity to inflate or overrate their perceptions (of their academic abilities)" (Langenbach and Korhonen, 1988,p. 144) only to have reality intervene in the form of a challenging course, low grade on a paper or examination, or limited progress toward completion of the academic program of study selected. This sometimes resulted in a decrease in academic self concept, albeit temporary. This lack of congruence between an idealized self and self as seen by others has been hypothesized by Boshier (1973) (in his Congruency Model of Participation and Dropout in Adult Education) to be a key determinant of attrition. To date, the results of testing his hypothesis have been mixed.

One finding which deserves serious consideration is the students' call for clear expectations from faculty. Students want to know what is expected, what is important, what kinds of assessment will be employed, and how they are doing relative to the faculty member's criteria of excellence. This finding parallels field studies which have reported that most adult students enter into new and stressful educational situations with a preference for high instructor dominance and low student autonomy (Kasworm, 1992). Further, it supports the contention that one of the features of academic self concept is its evaluative character with "evaluations made against absolute standards such as the "ideal" ... and against relative standards, such as "peers" or perceived evaluations of "significant others." (Shavelson, et. al. 1976)

This call for clear instructor expectations occurs during a period in distance education's history when there is a growing emphasis on providing increased learner control and less teacher-centered instruction, in opposition to somewhat behavioristic instructional systems design models (Evans and Nation, 1989). Multistage models are emerging with the goal of assisting students to become more self-directed in their learning. For example, Kasworm (1992) advises that high quality distance education programs should provide introductory courses and fundamental knowledge at Stage One (high instructor dominance, low student autonomy). Subsequent educational experiences however should move students through Stage Two (moderate instructor dominance and selected student autonomy) to Stage Three which features student designed learning experiences with the instructor in a facilitator or co-instructor role. Of particular concern is that while a number of students expressed growing confidence in their ability to successfully study at a distance, these same students raised serious doubts about their competence and confidence relative to one or more bodies of content. This appears consistent with the conceptualization of academic self concept as increasingly less stable as one proceeds toward more specific aspects of subject matter and specific situations related to that subject matter (Shavelson, Hubner and Stanton, 1976).

This finding of a situation specific, (e.g. a course) academic self concept seems consistent with the findings of Bernard and Amundsen (1989) that student background characteristics influence dropout decisions in certain courses. It may be further stated that "any model of program attrition must take into consideration the nature of the learning tasks in individual courses." (p. 43) Thus, a model of instructional design and learner support which advocates increasing student autonomy over time will fail to meet the need for direction and support for the student who lacks confidence and perceives a lack in competence for a specific subject or aspect of a subject toward the end of study.

This study's findings are also supportive of Pratt's thesis (Pratt, 1988) that self directedness is a relational construct in contrast to the predominant presupposition that preference for self directedness is intrinsic to adulthood (Knowles 1980, 1984). Pratt's analysis suggests that individual psychological differences are largely impermanent and malleable and assumes that the learner's state of dependency is momentary, situation specific and therefore changeable (p. 161).

More specifically, he suggests that learners have a variable need for direction and support from the teacher. According to Pratt, learners need direction when they lack the necessary knowledge or skills to make informed choices. Direction includes the provision of information relative to the content to be learned, the assignments and tasks to be completed, the evaluation criteria for acceptable performance and monitoring learner progress while providing feedback on performance. Support is necessary when the learner's commitment to the learning goals is low. An example is completing a required course in which the student is not interested and perceives without value, when the student lacks confidence in their ability to accomplish the goal. In such a situation, rather than advocating a press toward andragogical practices and enhanced learner self directedness, Pratt (1988) suggests providing an opportunity for the learner to make an informed decision relative to the need for direction and support while expressing a preference for control based on his or her own academic self concept and associated levels of confidence, competence and commitment.

Recent research by Baynton (1992), focusing on factors associated with learner control in the distance education teaching/learning transaction, further supports Pratt's (1988) thesis and the findings of this study. While testing a model of control in the teaching/learning transaction, factor analysis produced a six factor solution with student competency, teacher/tutor support, and choice accounting for 39.6% of the total variance. Student competence, (accounting for 20.4% of the total variance) included such variables as study skills, ability, confidence, motivation, time management and emotional support reflecting both skill and dispositional elements of learners. Teacher/tutor support included treating student like a peer or equal, provides encouragement and support, encourages own ideas and teacher directs learning accounted for 10.3% of the total variance with choice, having a say in assignments, process and grades, content covered, and an opportunity to discuss choices with faculty members, accounting for 8.9% of the total variance.

Distance education with the separation of teacher and learner and often learner from peers places considerable control for learning in the learner's hands. Findings from this and other studies suggest there is a variation in the willingness of learners to assume this control, in part as a result of students' assessments of their abilities as learners. The movement from dependence to independence is not linear given the situational nature of the construct with course variables, including, for example, nature of the content and faculty expectations.

From these data, it appears that certain institutional factors including, clarity of expectations in course materials and ready access to faculty for consultation, and other support services, could positively influence a learner's academic self concept which could, in turn, contribute to increased persistence.

Implications For Practice

If academic self concept is as highly associated with students' persistence in external degree programs as data indicate, educators should strive to optimize enhancers and diminish detractors to this academic self concept. Analyses of these data to date, provide support for continuing a number of already suggested, although not widely used, practices. For example, a student orientation should be provided which introduces procedures for learning at a distance including roles and responsibilities of teachers and learners. The process of directing one's own learning and study strategies also seem appropriate early in a student's program. As Garrison and Baynton (1990) note, when given the opportunity to control their own learning, students may be not only unwilling to assume the level of control required, as Pratt (1988) has suggested, but also lack the ability to assume the responsibilities associated with being a self-directed learner. The learner's past learning strategies are not always successful and a limited repertoire of learning strategies provides limited choices to deal with a new educational situation, such as learning at a distance. Educational experiences which touch on adult development, especially learning in adulthood and learning how to learn should also be incorporated where possible. Optional time management and stress management programs also seem indicated to help the student juggle their life as student with roles and responsibilities in work, family and community. The inability to manage both time and stress has been identified not only as a barrier to participation in educational activities (Cross, 1981), but are also associated with attrition (e.g. Powell, Conway and Ross, 1990).

Of particular importance, of learning specific content, is the need for clearly outlined expectations on the part of the instructor. Signposts indicating important points for student's special attention would further assist learning. Sample questions and appropriate answers, from the instructor's perspective, may also help. Even samples of exemplary assignments or less than exemplary assignments with comments indicating areas for improvement seem indicated to help learners judge the quality of their work, if only against the teacher's criteria. While recognizing the need for students to assess their own personal needs and tailor the course to meet their learning goals and expectations, many learners appear to lack the necessary level of confidence and perceived competence for this degree of self directedness at initial stages of their program. However, given the situation specific nature of academic self concept, it is important to provide options which students could elect to take greater or lesser control over learning goals, methods, and evaluation strategies in all courses regardless of level, introductory or advanced.

One point was stressed repeatedly in this and earlier studies (e.g. Graff and Coggins, 1989): the difficulty of making that first phone contact with the professor to ask a question. Students continually voiced the need to be prepared, not to "sound like an idiot." It would seem that an instructor-initiated phone contact during the first three weeks to ask if the student had any questions might indeed answer a number of students' questions (related to such concerns as expectations and educational processes) and thereby enhance academic self concept and perhaps the submission of written assignments.

Further, feedback on assignments seems important if only to help students assess their strengths and weaknesses and more realistically judge their abilities. Self-assessment tools imbedded in study materials could also bolster a student's confidence as they would know when they were 'ready' to take an exam given their scores on similar self-testing devices. In addition, the nature of examinations needs to be specified. Where possible, examination hints might also be included, particularly for less familiar types of examinations like the oral exam.

Again, these implications for practice (such as regarding learner support and instructional design) are not new. They are practices that have been advocated before but are now being reemphasized for their potential to positively affect a learner's academic self concept which is associated with success in distance learning programs. Additionally, it is suggested that opportunities be provided to help learners assume as little or as much control over their studies as is appropriate for the academic standards of the institution. Longevity in learning in a distance education program may not be indicative of the degree of self directedness a learner can or is willing to assume. Difficult courses, as defined by the learner, are often left to the end of their degree programs. By no means does this diminish the support needed from faculty members and others.

Implications For Research

Academic self-concept is but one construct affecting persistence in external degree programs. Additional research is needed to more fully understand its many facets as well as assess its relationships to the constellation of other constructs which have direct or intervening effects on persistence. As Snow (1989) notes in his discussion of cognitive and conative structures in learning, one needs to consider the initial states of learners, their desired end states and the transitions between these states given the impact of instruction to impact the transition from initial to end states. What becomes clear is that

> Achievements become aptitudes for further learning, and knowledge, skill, strategy, regulation and motivation intermingle; all have both cognitive and conative aspects. (p. 9)

The need to more fully develop and validate this construct is apparent as well is the need to develop measurement approaches to assess it. If a reliable and valid measure could be designed, one which takes into consideration the adult as learner, educational program content and the context of distance education, it could be used to identify learners potentially "at risk" of failure. The distance teaching organization could then target intervention and empowerment strategies to those most in need. Further, measuring effectiveness of these individual intervention strategies would be facilitated by excluding those who neither need nor want additional or special services either from the outset of their studies or at specific points during the course of their educational pursuits.

Powell, Conway and Ross (1990) posit a model of student success and persistence which suggests that students' predisposing characteristics (which they suggest are either fixed or slowly changing throughout the learner's involvement in distance education) exert a relatively constant influence on students' chances of success. These predisposing characteristics are seen as antecedent predictors with life changes and institutional factors acting not as direct causes of student dropout, but acting primarily in interaction with predisposing characteristics. The findings of the research reported here suggest the need to begin to test institutional interventions for effectiveness in enhancing academic self concept. For example, faculty initiated first phone calls, varying levels of learner control over educational goals and the accomplishment of these goals, and their differential affect on success given students' predisposing characteristics might all prove useful in action.

The list of possible areas for research is vast. Academic self concept plays an important role in learner persistence in distance education and that this facet of general self concept is a dynamic and situational attribute of the distance learner, one which is amenable to intervention. Institutional practices can affect this all important variable with simple modifications in educational practices which can potentially enhance the learner's success in academic pursuits.

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Critical Factors In The Development Of Distance Education Materials: An Australian 'Outback' Perspective

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Abstract

Developing large scale and comprehensive sets of distance education materials for use by primary aged children in isolated and remote areas requires a sophisticated and cohesive system of checks and balances and a clearly understood set of educational principles upon which the development of the materials is founded. Based upon information gathered during recent research projects employing extensive interviews, on-site visits, questionnaires and analyses of existing documentation, this paper will discuss the crucial factors perceived to be necessary in guaranteeing success in such an endeavor. Such factors cover the assumptions, intentions, processes and outcomes of the design and development of the materials, the process of implementation and its effect upon the users and the outcomes of distance education study for learners.

Introduction

Currently, Australian education is structured upon the fundamental belief that equality of educational opportunity is a central goal of educational providers, if not a right that all consumers of educational services can expect. Throughout its history this concept has been interpreted in many ways. From the narrow instrumentalist view suggesting that equal resources guaranteed equality, to the more expansionist view focusing upon the recognition that equal opportunity may not be met by equal treatment, equality of educational opportunity continues to dominate the educational debate. When the issue of providing educational services to isolated areas of Australia's outback is being discussed, further intricacies of social justice, access and equity are introduced. Such issues eventually focus upon the under-represented segments of the population. One such segment is that population of school children who study through distance education. Previously known as schools of the air and correspondence schools, these means of delivering educational services to isolated and remote locations have received much media attention over the years, and have, along with the Royal Flying Doctor Service, added a level of populist intrigue to the mythology of outback life. Such levels of attention however, are more appropriately applied to analyses of the service and its outcomes. Until recently, these analyses have been largely absent.

This paper presents the results of research which focuses upon perceptions of those involved in the development and use of distance education materials for primary aged children. In so doing, those crucial factors perceived to be necessary in guaranteeing success in such an endeavor are conceptualized and the question of quality assurance as a function of distance education services is raised for further analysis. The outcomes of this activity attempt to fill an increasingly obvious gap in the research literature, and, by presenting the notion that equality of educational opportunity for distance education students can not be achieved through equal treatment or equal resourcing, recognize the centrality of contextualisation in the provision of educational services to those learning at a distance.

Although the topic of this paper is derived from the broad research area concerned with the provision of educational services to isolated and remote areas, it must be kept in mind that the specific focus treated is that relating to factors seen to be central to the design and development of distance education materials. The discussion concludes by recognizing the importance of extraneous factors and attendant services that both impinge on this process and upon which the success of implementing the materials depends.

Literature Review

In defining distance education, Holmberg (1977) described a variety of forms of study which were not under the continuous or immediate supervision of teachers in classrooms, but which have benefited from the planning, guidance and direction of an educational organization. Keegan (1980) elaborated further by drawing contrasts between distance education and more recognizable forms of schooling. He highlighted:

- the separation of teacher and learner which distinguished it from face to face teaching;
- the influence of an educational organization which distinguished it from private study;
- the use of some form(s) of media upon which the educational content depended;
- the dependence upon two way communication for the benefit of both teacher and student; and
- the possibility of occasional meetings for social and didactic purposes.

In a report funded by the Ministry of Education in Victoria in 1989, the definition of distance education was stated simply as that education based on a combination of structured study materials and regular interactions between student and teacher at a distance from each other.

In recognizing the immediate difference in the learning context inferred by these definitions, Keegan (1977, 12-17) raises the issue of the production of 'good courses' and the need to 'teach them well'. In listing additional needs such as specifically trained staff and the inherent problems of evaluation in this form of teaching, Keegan provides the context in which the writing of Worthington (1980) can be set. In discussing the need for curriculum, organizational, delivery and support system renewal in Queensland distance teaching systems, Worthington focuses upon the need to recognize the variety of delivery modes made possible by technological advances and stresses the necessity of breaking the nexus between curriculum design for distance education and traditional curriculum design. Perraton (1981) continues the line of this argument by suggesting that practitioners of distance education have avoided the theory of the subject and considers that answering some of the questions resulting from a theoretical analysis of the topic could lead to more useful distance education teaching. He suggests that any theory of distance education must be an evolving theory based upon current theories of educational practice and advances in communication technologies.

The direct link between distance education teaching practices and traditional schooling practices has also been explored in the literature. Frank Darnell (1981) raised the question of the purpose of equality of educational opportunity for rural residents and concluded that "regardless of the ability to learn, regardless of the ultimate level to be attained, regardless of where the student lives, and regardless of a person's parental circumstances", systems of education had the responsibility of providing the opportunity for each students to advance to the limits of their ability. It is made clear in Darnell's reactions to this topic that equal treatment and equivalent forms of assistance may be unacceptable institutional reactions to the problem. In addressing similar issues, Miller and Gordon (1974) emphasize the 'end product' of the process suggesting that "where what children bring to the school is unequal, what the school puts in must be unequal and individualized to insure that what the school produces is at least equal at the basic level of achievement."

With such social justice implications hovering around the topic of service provision to remote and isolated areas, the question of support services for those consumers of distance education, still at the compulsory schooling age, often raises much attention. In a

Commonwealth Schools Commission report on Schooling in Rural Australia (1987) an emphasis upon support services for students on distance education programs was raised and the need to improve such services was recognized. The same report referred to advances in communications technology and its impact upon the improvement of distance education services. The Commission's view was that technological advances are seen as likely to ease the difficulties associated with studying at home in remote areas.

During 1986, a report dealing with similar issues was forwarded to the then Queensland Minister for Education, the Honorable L W Powell, MLA. This report contained many supportive comments about existing distance education services and the dedication of present staff, but raised serious concerns focusing on the lack of co-ordination between the various levels and types of services and the effects this has had on the continuity of programs. The Commonwealth Schools Commission (1987) recognized the importance of these services and the difficulties emphasized by isolation, suggesting that the machinery for special education for example, was well established in the states but in almost all cases was not getting past the populated areas. The report concluded that for the educational good of isolated children and the sanity of their supervisors, accessibility to specialist services had to be facilitated and publicized.

The provision of specialized experiences for isolated learners has also been raised to the attention of service providers. The Commonwealth Schools Commission (1987) has suggested that "there is a special need for students from isolated communities to be given exposure to, and stimulation of interest in, other people and places. Understanding the way of life of other people does not mean that they will necessarily undervalue their own, and it should help them to make a more balanced choice for their future." (p105)

The same report presses further by focusing upon the role and functioning of those adults interacting with distance education learners. The following quotation clarifies the situation.

"Parents of students studying at home using distance education services have special needs, particularly parents who act as 'home tutors'. These parents may often feel unable to provide adequate supervision for their child, due to lack of knowledge of subject matter or to lack of awareness of teaching methods or strategies. They may also feel that the home tutor role and the parent role are to some extent in conflict, especially in the small social world or a remote property. Home tutoring may also conflict with other responsibilities of the parent, such as assisting with necessary management and other tasks on a family farm. Conflicting responsibilities, as well as feelings of inadequacy in the home tutor role, can be especially stressful if the child studying at home has a disability or learning difficulty. (p49)

Even apart from the situation where specialist help is required, the role of the home tutor in supplementing the structured distance education materials being used by isolated learners has been raised for critical attention. Jennison(1992) goes to great lengths to provide evidence which confirms that "the educational program of the isolated child is dependent for its success on the active involvement of the home tutor" (Taylor, 1984). In emphasizing the dependence of the untrained home tutor on the structured approach of current distance education materials, Jennison(1992) discusses the quality of these materials in ensuring success in a variety of home learning situations.

Attention in recent research activities has begun to focus upon both this question of the quality of the materials and the appropriateness of delivery mechanisms traditionally used in distance education. In a treatise dealing with what they see as an inevitable evolution of distance education to an open learning process, Postle and Higgins (1992) quote a Queensland Department of Education Report defining open learning as "...those strategies and practices which allow all students to gain access to the curriculum options and programs that best suit their needs." (p46) In suggesting that the majority of distance education methods currently in use are based on "combinations of printed materials and various outreach or inreach techniques", and that designers, "in compensating for students inability to attend a "normal" school, ... opt to use mainstream frameworks for delivering these programs", these authors force attention onto the viability of current practices and the educational principles upon which they are based.

Documents obtained from the Queensland Department of Education indicated that considerable time and resources have been committed to the development of a support structure for distance education in that state. These documents also provided a framework which described those educational principles purported to be an acceptable theoretical foundation for the development, production and implementation of distance education materials.

A set of "ten guiding statements", developed as an outcome of the State Conference of the School of Distance Education by Hobbs (1988), is reported in both Language Across Curriculum and School of Distance Education Conference Document (1988). An analysis of these statements has produced a set of educational principles upon which distance education materials production should be based.

One such principle is Coverage. Coverage is the need for the materials to encompass the content of the curriculum being offered in the schools. This is reflected in statements that relate to the need to include all the relevant subjects and their various elements.

Developing distance education practices and materials should aim to ensure a broad curriculum experience for all students. (Queensland Department of Education, 1992, p.29; Queensland Department of Education, 1988, p. 27.)

Coverage also includes the necessity to ensure that a pupil could, at any time, move from the distance education mode of study to any school in the state and not be disadvantaged educationally.

The distance education provided should be such as to equip students for the transition from distance education to other forms of education. (Queensland Department of Education, 1992, p.29; 1988, p. 27.)

This position is also reflected in the Distance Education Curriculum Philosophy in which the following planks are identified as central to the beliefs of the Collegiate Management Group of the Department :-

The curriculum must:

- cover the range of curriculum areas;
- provide an interface with mainstream education.

(Queensland Department of Education, 1989, p. 7.)

Consultation is a principle underlying the position adopted by the Queensland Department of Education. In this context, consultation refers to the need for due deliberation and consultation with various stakeholders involved in distance education prior to implementing change.

In the development of new practices and materials, care should be taken to avoid moving too far too quickly from familiar practices and formats. When novel formats or practices are to be introduced, home tutors need to be prepared, supported and reassured. (Queensland Department of Education, 1992, p.29; 1988, p.7.)

The principle of practicality indicates that the materials produced for a distance education program should be designed to fit specifically into the environment in which they are to be implemented. This principle is reflected in the demand that materials should take into account both the competencies of the home tutor and the physical environment of the pupil in their construction.

New practices and materials should not overtax the home tutor's time, effort, or expertise. The preparation of materials should reflect first-hand familiarity with the home life and learning arrangements of distance education learners. (Queensland Department of Education, 1992, p.29; 1988, p.7.)

The need for extensive and effective communication in the process of development and implementation of distance education materials is also recognized as an important principle. Such communication is crucial during the development of the materials.

Throughout the development process, comprehensive communications links need to be maintained among stakeholders. (Queensland Department of Education, 1992, p. 29.)

The need for a systematic and comprehensive communication network also appears to be essential for the provision of support to home tutors in situations involving the implementation of innovative programs incorporating content and strategies with which they are not familiar.

When novel formats or practices are introduced, home tutors need to be adequately prepared, supported and reassured. (Queensland Department of Education, 1992, p.29)

In addition the need for clear communications in the actual materials is essential to ensure that their implementation is appropriate.

Materials need to be accompanied by clear unambiguous instructions and guides so that home tutors and students can keep track of progress, requirements met, and future requirements. (Queensland Department of Education, 1992, p. 29).

Flexibility also appears to be a principle outlined in the ten guiding statements identified in the documents. This principle places stress on the need to be aware that distance education materials must meet the needs of individuals in differing environments with differential access to resources and with different starting abilities and experiences.

Developing materials and practices should have built-in flexibility to allow for adaptation to: .

- changing conditions over time
- conditions in different localities
- various types of home life and learning arrangements, and
- individual differences among children.

(Queensland Department of Education, 1992, p. 29)

That the materials should also encourage the pupils to become independent learners, although not included in the ten guiding statements, was stressed in the keynote address presented at the 1988 conference when the point was made that distance education materials should " foster high levels of interaction between the learners and the materials."(Queensland Department of Education, 1988, p. 10).

Closely related to the principle of communication is feedback which is concerned with the specific communication of evaluative data relating to the performance of the materials and assessment data relating to the performance of pupils.

The progress of learners in Distance Education should be monitored and reported in such a way as to ensure that defined educational standards are being attained by each learner and that all necessary information about each learner's progress is available for appropriate purposes. (Queensland Department of Education, 1992, p. 31).

The points listed by the Collegiate Management Group in their Distance Education Curriculum Philosophy are largely incorporated in the principles listed above. They have, however, identified some specific principles which show the need for an awareness of the elements of curriculum design in the development process and which are presumably employed in the development of the materials in current use. That is, consideration of the issues of specific content selection and organization, and selection of appropriate teaching strategies and resources are fundamental. For example, such statements specifically indicate that the Language Across the Curriculum materials should be 'Language based' and 'process based'. In addition, they indicate specific content guides in stressing that the materials must 'reflect the main elements of Australian culture and society'. These statements also make reference to incorporation of specific teaching materials when they stress the 'promotion of worthwhile activities', which are to be both 'learner and resource centered'. (Queensland Department of Education, 1989, p. 7).

Methodology

Sample

The sample used in this study comprised representatives from the three principal groups involved in the design, development and implementation of distance education materials in Queensland. These three groups have been labeled developers (D), teachers from Schools of Distance Education (SDE) and home tutors (HT).

The developers are all located centrally and are employed by the Department of Education in Brisbane. The sample of 'developers' contributing to this study totaled 34 staff including seventeen writers responsible for the design, generation, coordination and editing of the educational content of the materials. Seventeen producers responsible for various aspects of the publication process were also included and this sub group comprised graphic artists, audio visual specialists and reprographic technicians. All data received from this group resulted from individual on-site interviews.

Those teachers participating in this study are all employed by the Department of Education and were members of the staff of the Schools of Distance Education located in Brisbane and in Charleville. Of the total sample of teachers contributing to the study four have been interviewed by telephone, four participated in individual interviews on site and the staff of one school participated in an on-site 'group discussion'.

The third of the 'principal groups' comprising the sample were home tutors who take on the responsibility of educating their children at home with the assistance of the materials produced by the developers and teachers from the various schools. Home tutors come from a variety of 'home classroom' situations ranging from isolated properties with one or more children of school age unable to attend schools or to receive professional tuition via traditional means as a result of their geographic location, to situations governed by an itinerant lifestyle where a caravan or yacht might be the 'home classroom'. This sample totaled seventeen individuals and the data collected resulted from six on-site interviews in the Charleville - Augathella region and eleven questionnaires from home tutors scattered across the state. Interview data were collected in open ended, flow of consciousness interview sessions.

Procedure

As inferred in the short descriptions above, the procedures used in this study focused upon the use of interviews and questionnaires as the principal means of data collection. Supplementary data from existing documentation in the form of feedback sheets, letters from individuals involved in the process and policy documents etc. have added to the composite picture presented in this paper.

Where interview schedules or questionnaire items were required, the research team presented a draft of the data collection devices to a formally constituted steering committee or to a team of experienced researchers, unrelated to the project, for trailing, editing and reformulation of items.

In all cases involving interviews, permission was first obtained from participants ahead of time and arrangements made by mutual convenience concerning the time and location of the interview. All participants were appraised of the intent, purpose and form of the interview ahead of time. With the exception of four telephone interviews, triangulation processes were incorporated in all cases through the use of audio-tape recordings of the interview for use in confirmation of interpretations, or through the use of two interviewers taking individual sets of notes of the interview. The data obtained through this process were therefore subjected to processes designed to reduce interviewer bias and increase both the reliability and validity of resultant information.

Data Collection

Instruments used throughout this study were designed to allow respondents sufficient latitude to provide their unrestricted views on those factors seen to be necessary considerations in the development of successful distance education materials from each of their unique perspectives. Although the form of each item differed slightly depending upon its intended use in either interview or questionnaire format, or with each particular group, the substance of the items followed the directions indicated in the examples presented below.

1. What specific needs do isolated learners have?
2. For learners in isolated or rural areas to make good use of educational materials what special features do the materials have to have?
3. What are important considerations in the delivery or implementation of educational programs for isolated learners?
4. What educational services are needed by learners in isolated areas?
5. For what audience should the materials be developed?
6. What educational principles underlie the development of the materials?
7. What critical factors effect the development of curriculum materials for rural communities?
8. If you were not restricted in any way, what changes would you make to the materials?
9. What typifies good/effective distance education programs/materials?

In all cases, the construction of the items encouraged responses which focused upon the full range of concerns pertinent to the study, but remained open ended in the sense that responses were able to reflect the views of each sample group without being restricted by the structure of the question, and semi-structured in the sense of allowing sufficient flexibility for investigator probing and clarification throughout the process and leeway to follow interviewee thoughts to logical conclusions without losing insights or 'thick descriptions' to interruptions dictated by an inflexible interview schedule. This process guaranteed both richness of data and consistency of questioning and data collection across all investigators and all sample groups.

Data Analysis

The value of team analysis to this research design became increasingly obvious during data analysis sessions. All data interpretations, categories and classifications were made to undergo stringent and critical scrutiny by all members of the team prior to acceptance as legitimate. Part of this process of legitimization was the continual search for connections with the raw data of the interviews and questionnaires. Repeated reference to interview tapes and written summaries created an 'audit trail' for each concept and category developed. Frequent repetition of these processes within the treatment of each research question lent credibility, transferability, dependability and confirmability (Guba and Lincoln, 1983) to the conclusions and groupings generated. An important feature of this research was the collaborative approach adopted by the research team in the classification and analysis of the data. Through the processes of 'inductive categorization', 'investigator triangulation' and 'subjectivity audit' (Peshkin, 1988, P.17) the research team was able to provide comparable measures of 'authenticity of data' represented in more experimental, scientific studies through measures of reliability and validity. The process of 'inductive categorization', or the categorization of questionnaire responses through a process of repeated organization and reorganization of the data into logically related groupings formed the major activity within this section. Each researcher analyzed responses until natural groupings began to appear and then, through the application of the process referred to as 'investigator triangulation', defended the groupings to others in the research team and adjusted categories until agreement was reached based upon reference, through an audit trail, to the raw data for verification. Any inevitable researcher subjectivity discovered during this process was identified and minimized through cross researcher comparison and agreement on data groupings.

Data Analysis and Discussion.

In evaluating the conceptual framework presented below, it must be kept in mind that the data forming the foundation of the discussion should neither be considered as a statement of the complete views of the groups represented in the sample, nor as a complete diagnostic indication of the orientation of each group. Rather, what is presented here is a composite picture derived from the three groups indicating agreement on the crucial principles perceived necessary in developing distance education materials. It should also be obvious that when data collected for another purpose is applied to a different task, the 'match' or 'completeness of fit' of the original data to the new task should be questioned. What is important in this situation is the conceptual framework derived as a result of the re-analysis of existing data, not an inappropriate focus upon perceived gaps in the data.

Six major conceptual principles underlying the development of effective distance education materials have been deduced from the review of departmental documents relating to distance education. These principles of design, coverage, consultation, communication, practicality and flexibility have been used as the basis of a system for categorizing the concerns of the materials developers (D), schools of distance education teachers (SDE) and home tutors (HT), who made up the sample. In the following analysis, each of these major principles is considered in turn, with associated sub-concepts derived from the data, and presented in tabular form.

Design

Design issues are defined as those relating to the elements of curriculum design, namely, the development, selection and adoption of objectives , content , teaching strategies, resources and evaluation / assessment techniques. These issues also include consideration of the competing social, philosophical and psychological sources of curriculum decisions. Consideration of the concerns raised by the different groups of subjects relating to this issue are shown in Table 1. In developing these categories all issues raised by the three sample sub-groups have been included. No effort to indicate the actual numbers who specifically identified each category has been made, as the purpose of this study is to identify and explicate a model that allows the analysis and comparison of those curriculum related concerns as perceived by the different groups of stake holders.

The sub-category of motivation incorporates comments from respondents suggesting that specific care should be taken in ensuring that the materials should serve as a stimulus to the pupils and should thus encourage them to become involved in the learning process. Specific suggestions made by SDE teachers included the need for the total package to present an exciting prospect to the pupil and for the activities included to be varied and interesting.

The home tutors agreed with these points but indicated that the format in which the materials were presented should also promote interest . Home tutors also expressed a belief that the use of color in the printed materials would provide additional stimulus for the students. In addition to those points raised above, material developers, including both curriculum writers and production staff, identified the importance of the art work as a further aid in the promotion of motivation.

The sub-category 'philosophical approach' evolved to include issues relating to the reasons why the materials were developed in the particular form in which they currently appear as well as incorporating comments relating to the need for changes to existing materials. Both teachers and producers identified the need for materials to reflect a modern or progressive approach. This is probably a reaction to materials which were replaced by those in current use which had been in operation for an extensive period of time. Home tutors agreed that it was time for a change but did not indicate that such a change should follow progressive

Design Issues		SDE	HT	D
1.Motivation	-student activities	√	√	√
	-exciting	√	√	√
	-colorful		√	√
	-format		√	√
	-artwork			√
2.Philosophical Approach				
	-modern/progressive	√		√
	-integrated content (themes)	√	√	√
	-child centered	√		√
	-independent living	√	√	√
	-active learning		√	√
	-target audience	√	√	√
3.Teaching Approach	-regular revision	√	√	√
	-sequenced skill development	√	√	√
	-variety of approach		√	√
	-appropriateness of approach to home classroom situation		√	
	-cater to learning styles			√
4.Support Materials	-appropriate to learner	√		
	-appropriate to home situation	√		
	-varied media		√	√
5.Multigrade Support		√	√	√
6.Evaluation	-Process			√
	-Product			√
	-Modify as a result of feedback		√	√

Table 1- Design issues relating to distance education materials identified by school of distance education teachers, home tutors and developers

educational principles. All groups identified the use of a thematic approach based on literature as the mode of content organization in the current materials. Teachers and developers believed that the program should be child centered . All groups recognized that the development of the pupil as an independent learner should be a priority. Similarly, all agreed that the materials should be developed for a specific audience but there was some disagreement about who that audience should be. Active learning which incorporated the need for the pupil to be actively involved with the materials was identified by both developers and home tutors as an important consideration.

Teaching approach included all of those components of the distance education materials relating specifically to the actual teaching strategies incorporated. All respondents indicated that the materials needed to address the need for regular revision to be built into the program. The particular need to ensure that there was provision for a sequential skill development throughout the materials was identified by all groups. The need to incorporate a variety of teaching strategies, including a stress on higher order skills, open ended learning situations, problem solving and rote learning, was emphasized by both home tutors and developers. These groups also identified a need for the materials to ensure that the experiences and teaching strategies incorporated into the materials were the most appropriate for the content and the environment. The developers also indicated that the strategies should cater for a range of learning styles.

Support materials' refers to materials supplied as part of the total distance education package in addition to the basic print materials. The teachers indicated that the materials should meet the needs of individual learners and should take into consideration the range of environments into which they are to be incorporated. Both home tutors and developers stressed that there should be a wide variety in the media included in the packages to cater for both individual preferences of learners and the variety of environmental conditions under which they interact with the materials.

A problem raised by all groups suggested concern with specific difficulties faced by home tutors responsible for implementing distance education packages in a multi level situation. This issue has been classified as 'multigrade' and requires constant consideration when materials are being produced.

Evaluation' is the need to ensure that suitable arrangements are made within the structure of a package to incorporate data collection indicating the level of success achieved in implementing the of study in the manner intended and that learning has occurred at a level intended by the developers. The developers indicated that arrangements need to be made to ensure that feedback on both the process (implementation of the package) and the product (effectiveness of the package) need to be incorporated. Both home tutors and developers indicated that any feedback relating to the materials should lead to appropriate modifications.

From this analysis it is clear that all three groups identify motivation, philosophical approach, teaching approach, support materials, multigrade problems and evaluation as issues in the design and development of distance education materials. This does not indicate that there are no differences between the different groups but rather that while the responses may vary the concerns relate to identical issues.

Coverage

Coverage is defined as the actual content to be included in the distance education package. While the literature dealing with curriculum design incorporates 'content' as an element of design, the emphasis given by respondents to the data collected on this issue indicated a need for separate consideration. Table 2 introduces the major principle of content under the label of coverage. The importance of this particular element of curriculum design is reinforced by the fact that it is dealt with in two of the ten guiding statements postulated in the departmental documents as well as in the Distance Education Curriculum Philosophy.

A basic principle seen by all respondents to underlie the development of the materials is that no student should be disadvantaged by geographical location in gaining exposure to appropriate content. The requirement that any package of distance education materials should cover the full content range of programs being offered to pupils attending schools is stressed by all groups involved in the production and teaching of the materials. While each sample group recognized the difficulties inherent in operationalising a complete solution for this concern, it was agreed that sensitivity to the need for equitable treatment was necessary. Given the desire identified by all groups to ensure coverage of all content areas,

Table 2 - Issues of Coverage relating to distance education materials identified by school of distance education teachers, home tutors and developers

Coverage Issues		SDE	HT	D
1.Covers content in combined syllabi		√	√	√
2.Covers specific content areas				
	-technology		√	
	-Australian		√	
	-exposure to range of experience	√	√	
	-range of life styles			√
3.Recognised standards				
	-maintenance	√	√	√
	-consistency		√	√
	-availability of		√	

both home tutors and developers have expressed some concern that certain specific content should be strengthened in some areas of the materials. Developers identified the need to ensure that isolated pupils were exposed to a range of life styles and cultures through materials and associated activities, while home tutors expressed a desire to see the area of technology expanded and indicated that materials and resources should emphasize Australian content.

All groups identified the need to ensure that the materials guaranteed coverage sufficient for students to achieve at a standard comparable to pupils in "normal" school situations. All groups reported a concern that the standards achieved by previous distance education materials were maintained or improved by exposure to revised packages. Home tutors and developers indicated that standards contained in the materials should be consistent with those expected of children in the broader community . Home tutors also expressed a desire for standards to be made explicit in the materials to enable them to ensure attainment in the home classroom.

From this analysis it is clear that the principle of coverage is considered to be of vital importance by all groups associated with the development and implementation of distance education materials.

Consultation

Consultation is the focus of the data presented in Table 3. This principle suggests that no materials should be developed without first taking into account the range of understanding and ability of home tutors. Also included is the need for developers to be aware of the opinions of all stakeholders. In addition to communication factors, the provision of support to home tutors, including training provisions is included in this section. This principle is supported by two of the ten guiding statements. (Department of Education, 1998; 1992) .

The data in Table 3 suggests that all groups recognize the need for individuals and groups involved in the development and implementation of distance education materials to communicate on a meaningful level. Such interaction should involve a two way process. All three groups stressed the importance of the consultation between the SDE teacher and the home tutor. This consultation would relate to such basic matters as the modification of the materials to meet individual needs, the review of the individual pupil's progress and the discussion of problems relating to implementation in the classroom.

The home tutors and SDE teachers identified the importance of consultation directly between the pupil and the SDE teacher. This communication enables the teacher to make decisions about the effectiveness of the materials and progress of the pupil. The materials need to ensure that such consultation is encouraged.

The material developers identified other needs relating to consultation as essential to effective operation of the package. These included the provision of feedback from the home tutor to the developer in both the developmental and implementation phases of the materials. They also stressed the need for a similar channel of communication between the developers and the SDE teachers. Additionally, the need for the home tutor to communicate directly with the pupil in appropriate ways, which may not have been stressed in previous materials, has been singled out for attention in relation to the development of new materials.

Table 3 - Issues of consultation relating to distance education materials identified by school of distance education teachers, home tutors and developers

Consultation Issues			SDE	HT	D
1.Interaction between those involved in the production and delivery of the materials			√	√	√
2.Training for Home Tutors					
	-Teaching strategies			√	√
	-Diagnosis			√	√
	-Management				
		•Discipline		√	√
		•Routines	√	√	√
		•Multi-Grade	√	√	√
3.Training for Writers and Producers					√
4.Feedback incorporated into			√	√	√

A sub-group of developers responsible for production of the materials has raised the importance of having direct access to feedback supplied by home tutors and SDE teachers. This sub-group also indicated the need for continuing dialogue between the groups responsible for material development.

Each group expressed concern about the provision of support to home tutors. Home tutors and developers indicated that home tutors could benefit from incorporating assistance in understanding and performing teaching strategies into the materials. These groups also identified the need for home tutors to develop the skills associated with diagnosing pupil problems. All groups recognized that home tutors may need help with some aspects of classroom management. They also identified the need to facilitate the development of classroom routines by the home tutor and the pressing need to provide assistance to the home tutor experiencing multiple grade situations. Both home tutors and developers indicated that home tutors would appreciate help in the area of classroom discipline. Some home tutors and SDE teachers suggested that a possible means of providing support and training for home tutors was through the establishment of home tutor networks for the purpose of sharing solutions to common problems.

A third sub-group of factors identified in this area was the need for training of materials developers. This particular proposal was put forward by the developers themselves and relates to proposals made earlier that this group should have extensive exposure to the environments for which they are producing materials.

A final component of this section proposed by all groups is the principle that feedback is a vital component of a distance education package. Feedback is seen as a two way process with the developers responding to the data provided by SDE teachers and home tutors through modifying the materials to reflect solutions proposed for problems detected during implementation.

From the discussion it is evident that all groups involved with the development and implementation of distance education materials agree that the principle of consultation is basic to the development of effective programs. The implementation of this principle involves the use of consultation between stakeholders, the provision of support structures to those untrained personnel involved in the implementation of the materials and ensuring that an effective two way process of feedback is an integral component of the implementation process.

Communication

Closely related to consultation is the concept of communication which is concerned more with the quality and clarity of the messages which form the basis of the process. The existence of this principle is indicated by reference to communications in two of the ten 'guiding statements ' which refer to 'communication links ' and the need for 'clear unambiguous instructions' to support the introduction of new materials. Data relating to this principle have been organized in Table 4.

From Table 4, all groups recognized the importance of communication in both the development and implementation of distance education materials. All groups indicated that there needs to be an appropriate amount of communication in all aspects of the process. Care should be taken to ensure that sufficient communication has taken place to allow all concerned to believe that their opinions have been registered and considered. Equally, communication for communications sake should be avoided as those responsible for implementing the program should not be "snowed under" with unnecessary reading and/or meetings. The hallmarks of effective communications were seen as precision and clarity. Both home tutors and developers indicated that the communication should be of a standard that could be understood by the most poorly educated home tutor. Home tutors were particularly strong in their support for this position although some of the production staff of the development group had expressed concern that care must be taken to avoid "talking down" to home tutors.

The second aspect of communication was the specialist function of feedback within the development and implementation cycle. All groups identified this function and home tutors indicated that response to feedback should be prompt when dealing with proposed alterations to materials. Developers indicated that production time lines would restrict the speed of implementing changes. The developers indicated that feedback was a two way process and that information communicated directly to them or through channels structured for the purpose would prove most effective. Both home tutors and developers agreed that feedback was of little use if it was not constructive.

Table 4 - Issues of communication relating to distance education materials identified by school of distance education teachers, home tutors and developers

Communication Issues		SDE	HT	D
1.Communication	-Amount	√	√	√
	-Precision	√		√
	-Clarity	√	√	√
	-simple		√	√
2.Feedback	-two-way	√	√	√
	-prompt		√	
	-effective		√	√

From this discussion it would appear that communication is a principle with which all groups associated with the development and implementation of distance education materials agree. It is closely related to the principle of consultation but refers directly to the quality of the delivery system and the message conveyed. For the process of materials development and implementation the most important component of communication is feedback. All groups recognize this importance but there may be some disagreement about how feedback is best reported and acted on.

Practicality

The belief that distance education materials should take into consideration the ability of the home tutor as well as the actual environment in which they are to be implemented is the basis of the principle of practicality. Information gleaned from the home tutors, SDE teachers and material developers relating to this concept is presented in Table 5.

The data presented in this table raise the issue of time as a limitation for home tutors. Each of the sample groups expressed concern at the amount of time required of home tutors to both prepare and present material. This was closely related to the second issues which all groups supported, the need to design the materials in such a way that the child would become an independent learner in as short a period as possible thereby decreasing the need for extensive supervision by the home tutor and freeing them for the performance of other duties.

The sheer bulk of materials was considered to be an issue related to practicality and was identified by members of each group. Similarly the need for teachers and developers to be aware of the learning environments in which the materials were to be implemented was recognized by all groups. Many home tutors indicated a belief that developers and teachers would benefit from spending time on properties and at other locations where the materials are used 'trying out' the product. Some of the production staff of the development group indicated that they believed that direct contact with the people for whom they were producing materials would be beneficial.

Related issues identified by home tutors included the need to have a range of resources available for borrowing as many required materials were not readily available in isolated areas. The use of foodstuffs and other consumables was seen to be problematical for those unable to 'dash out to the shops' at a moments notice. The danger of identifying specific environmental resources on the ground that everyone would have access to them was extensively criticized by home tutors.

Practical Issues		SDE	HT	D
1.Time	-implementation	√	√	√
	-preparation	√	√	√
2.Decrease need for supervision		√	√	√
3.Volume of materials		√	√	√
4.Awareness of learning environment				
	-SDE teachers	√	√	√
	-Developers	√	√	√
5.Access to necessary resources			√	√
6.Use of environmental resources			√	
7.Awareness of limitations of home environment		√	√	√
8.Format	-Usable	√	√	√
9.Resource Features	-longevity		√	
	-cost		√	

Home tutors and developers pointed out that it was important for the format to be practical in that it should not require the home tutor or the child to waste valuable time in searching for parts of a lesson or resources for a lesson. One of the teachers pointed out that the format of the materials must also be capable of being accommodated in a variety of environments where space is at a premium.

Additional concerns relating to resources identified by home tutors and developers included the notion that use over a number of years, especially when they are to be purchased by the family should be a selection criterion. Such resources would include dictionaries and atlases. Clearly, the cost of additional resources should be a consideration.

Practicality is clearly a principle underlying materials development and implementation that is recognized by members of teaching, home tutor and developer groups. The issues that contribute to this principle are largely concerned with ensuring that the materials and the resources and requirements which accompany them take cognizance of the environment in which they are to be implemented. Every attempt should be made to ensure that the materials are as non-disruptive of that environment as possible.

Flexibility

The principle of flexibility derives from the ten 'guiding statements' and their emphasis on the need for practices and materials to adapt to varying circumstances relating to time, locality, home environment and individual differences. Data which relate to this principle are presented in Table 6.

Table 6 presents a variety of suggestions regarding the incorporation of flexibility into the materials. All groups indicate that a range of teaching strategies could be incorporated in the units to allow selection by the home tutor in matching the needs of the individual pupil in a given set of circumstances. That time requirements should be flexible is also recognized by all groups. Some elements of a more flexible approach to time would be the introduction of variable calendars where home tutors would be able to adjust work loads to fit such needs as variable property work requirements, family holidays, and weather conditions. The need to vary time to cater for the individual differences among pupils is also recognized by all groups. The home tutors and the developers also indicated that the increase of the length of units from the standard two weeks would increase flexibility.

All groups agreed that any consideration of increased flexibility must include an analysis of the delivery schedules. Such an analysis could lead to materials being made available for longer periods, and in advance, which would increase the options available to the home tutor. The individual needs of students would also be catered for by the development of a more flexible format which could incorporate a longer period of time being made available for revision or extension activities.

Yet another possibility would involve catering for a range of environments within the materials or of assisting the home tutor to vary the program to meet the needs of the particular environment. Although teachers and developers recognize this possibility it would undoubtedly place a greater demand on the time available to the home tutor. Home tutors along with developers have raised the possibility of flexible resourcing where home tutors would be able to select from a range of resources those that were most appropriate to their needs.

Table 6 - Issues of flexibility relating to distance education materials identified by school of distance education teachers, home tutors and developers

Flexibility Issues		SDE	HT	D
1.Range of strategies for HT selection		√	√	√
2.Time	-variable calendars	√	√	√
	-accommodate student ability	√	√	√
	-Variable rates of work	√	√	√
	-length of units		√	√
3.Delivery Schedules		√	√	√
4.Flexible format to suit student needs		√		√
5.Variety of content to match localities where approp.		√		√
6.Resource Selection			√	√
7.Relate to needs of SDE teachers		√		√

The principle of flexibility is seen as underlying the development of distance education materials by all the involved groups. Such flexibility should incorporate consideration of the curriculum elements of resource and strategy selection as well as attempts to allow more flexible use of time in meeting the requirements established by the particular package.

Attendant Issues

As the nature of distance education is dependent upon more than just a set of well designed and constructed materials, data collected during this study tended to incorporate reference to many additional factors which effect the success of the overall product of student learning. At times respondents had difficulty drawing the line between these factors and those relating directly to the materials. For example, clear reference has been made to the need for legislation guaranteeing adequate budget authority for organizations attempting to overcome the 'tyranny of distance' to supply an equal educational opportunity for isolated learners. The need for a specialized support service structure (including special education services, counseling and materials support), the establishment of information networks for home tutors and subsidized access to existing community infrastructures has been raised repeatedly. Instrumental improvements to existing systems of communication using current and improved technologies as the basis of educational delivery systems have been suggested, along with re-established delivery processes and access to commercially available resources. The most frequent suggestion however, referred to the need to provide opportunities for social interaction and social skill development as frequently and via whatever technologies were available. Clearly, there is more to the question of what makes a good distance education service than ensuring quality materials.

Conclusions

While this paper is not designed to provide statistically significant and conclusive data supporting the centrality of certain principles as guarantees for success in the development of distance education materials for primary aged children, it is clear that agreement on general factors from the three principal groups involved in the design, development and implementation of these materials would indicate substantial credibility for the claim that such factors should hold a central place in the design and development of distance education materials. The literature providing the theoretical backdrop to this study also confirms the need for recognition of those factors and principles which guarantee equality of educational opportunity and quality assurance to all consumers of educational services regardless of location. Although recognition has also been made of the necessity of specialized support services and their coordination in the provision of acceptable educational services to distance learners, this analysis focuses predominantly upon the materials themselves. In this study, the question of contextualisation of the educational

Table 7 - Principles underlying the development of distance education materials as perceived by school of distance education teachers, home tutors and developers

Principle	Contributing Factors
1. Design - Approach to the selection of objectives, content, teaching strategies, resources and evaluation techniques	
Motivation	Philosophical approach
Teaching approach	Support materials
Multigrade support	Evaluation
2. Coverage - Selection of actual content and range of content to be included in the materials	
Covers syllabi	Covers more than 'basics'
Recognized standards	
3. Consultation - Frequency of structured reference to stakeholders and incorporation of stockholder input and needs in all aspects of the process	
Stockholder interaction	Training for implements
Training for developers	Feedback structures
4. Communication - Quality and clarity of messages forming the basis of verbal and written interaction prior to, during and following instructional sessions	
Amount	Precision
Clarity	Simplicity
5. Practicality - Appropriateness of materials and teaching approach to limitations of home classroom learning environments, levels of home tutor skill etc.	
Time	Reduced supervision
Bulk of materials	Learning environment
Access to resources	Environmental resources
Format	Resource Features
Limitations of home environment	
6. Flexibility - Adaptability of materials and teaching requirements to varying circumstances relating to time, locality, home environment and individual differences in students, home tutors and teachers.	
Range of strategies	Time
Delivery schedules	Format to suit student need
Variety of content	Resource selection
Relate to needs of SDE teachers	

service proved to be central in the final analysis of the suitability and quality of any service provided to learners studying at a distance.

Although it is clear that variations of opinion on specifics occur between the three principal sub-groups of the sample, little argument exists on the importance of the major principles that are seen to provide a foundation for effective distance education materials. Issues of design, coverage, consultation, communication, practicality and flexibility have been shown to be of predominant concern to those involved in the design, development and implementation of the materials. Table 7 summarizes the factors perceived to define each major principle.

In attempting to isolate the crucial factors necessary in the development of distance education materials, the data presented relates to the reality of the existing approach to distance education services in Queensland. While discussion presented above is limited by those decisions defining the general orientation and style of existing distance education materials and services, one cannot help but speculate on the possibilities of improving distance education services by adopting an entirely different approach to the philosophy and packaging of such materials. Notwithstanding this alternative, clear agreement and understanding by all stakeholders on the definition of each of the principles and factors outlined must precede any action. The assumptions, intentions, processes and outcomes which describe the form of education provided to learners in isolated areas of this country cannot be left to chance or traditional practice.

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* Part of the data used in this study was collected for another purpose by a research team comprising the authors of this paper and J.Kemp from the Distance Education Centre at the University of Southern Queensland.

Multiple Perspectives on Implementing Inter-University Computer Conferencing: A Symposium

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The purpose of this symposium is to discuss the organization, design, implementation and preliminary evaluation of an inter-university collaborative learning experience that used computer mediated communication (CMC) to link graduate students in several universities to discuss issues related to distance education. The discussion is based on the Globaled project, a computer conference that was set up and implemented for the second time, during the Fall 1993 semester. Globaled was first implemented during the Spring of 1992. With the increasing offering of distance education as a graduate discipline in many traditional universities, Globaled, can be seen as a unique way to connect graduate students across States and countries to participate in discussions related to the field of distance education.

The objectives of the symposium are to:

1) Discuss how collaborative learning among graduate students located at different universities can be organized and facilitated via computer conferencing. This would include, planning and organization, and how Globaled was integrated into traditional or distance classes at each participating university.

2) Discuss the role of student moderators at each institution, and how the research project was conducted at each site.

3) Discuss the technical system and the technical training at each participating institution.

4) Examine the dynamics of the conference, and how the Globaled project and the on-line environment impacted information sharing, knowledge building, communication, and social cohesiveness of the group.

5) Provide guidelines for future inter-university collaborative projects using CMC, basing the discussion on the positive and negative aspects of the Globaled project.

This discussion will be based on faculty perspectives and student reactions to the conference. In this symposium, faculty members from the participating universities will address the above mentioned objectives from the standpoint of their own institutions. Faculty at each institution had different goals for their particular courses but were able to integrate Globaled activities in a number of ways as part of the course requirements. The technical system and the technical problems experienced while running Globaled will be discussed by the Technical List Administrator at the University of New Mexico. Based on these numerous perspectives, guidelines will be provided for future inter-university collaborative projects.

"Globaled," was designed with two major purposes in mind: a) to provide an inter-university forum for graduate students enrolled in distance education and telecommunications to discuss issues related to distance education, and b) to provide an opportunity for these students to experience CMC, a medium that is becoming extremely popular in the delivery of distance education. Therefore, it was expected that students would experience distance education via a distance learning medium and learn first hand the issues related to facilitating group interaction online. Globaled was premised upon a learner-centered collaborative learning model where the learner would be an active participant in the learning process involved in constructing knowledge through a process of interaction and discussion with learning peers and instructors. Graduate classes in six universities: San Diego State University (SDSU), Texas A&M University (TAMU), University of New Mexico (UNM), University of Oklahoma (OU), University of Wisconsin-Madison (UW-Madison), and the University of Wyoming (UW), were major participants and moderated discussions on Globaled. A few interested students and faculty in two other universities: Pennsylvania State University (PSU) and the University of Wollongong in Australia also participated in the discussions. Several other interested persons in the U.S. and overseas were observers. Globaled had approximately 90 participants. Most graduate classes that participated in Globaled were traditional on-campus classes except for two institutions: Texas A&M which had students in three locations in Texas and where the class was taught by compressed video, and the University of Wisconsin-Madison where the class was taught entirely via computer conferencing.

Planning and Organization

Advanced planning, collaborative planning and organization were key to the successful operation of the conference. Planning by faculty at participating universities began in the Spring 1993 semester through an electronic distribution list and was finalized at the Distance Teaching and Learning conference at Madison in August 1993. Because of the success of the 1992 Globaled conference, faculty who had participated in the conference, and other faculty who expressed a desire to participate in such a conference, wrote to the Associate Dean of the College of Education at the University of New Mexico requesting assistance for a re-run of the Globaled conference. In response to these requests, the College of Education funded a graduate assistantship for a doctoral student to act as the technical coordinator and list administrator for Globaled. Each faculty member took the responsibility of training students to use e-mail and a listserv at their respective sites.

The conference was organized so that the first three weeks would be spent on introductions before the scheduled activities began. This period would also give students adequate time to train on the technical system and post their first messages to Globaled. Getting to know each other is very important as computer conferences generate complex social environments where social interactions tend to be unusually complicated because of the necessity to mediate group activity in a text-based environment. In order to create the sense of an online community and promote social cohesiveness, participants were asked to introduce themselves and talk about their professional interests and experiences, but were asked to keep their introductions devoid of social status cues. The second and third week of the initial introductory period was devoted to discussing respective classes, syllabuses, and class projects so that the participants got a sense of the online community and the work their peers were involved in at participating universities. Participants soon connected with those who had similar professional interests.

The faculty member at UNM coordinated the Globaled project. She also functioned as the overall moderator of the conference and was assisted by the technical coordinator in moderating functions. During the first three weeks, the UNM moderators posted the subscription procedures and the communication protocols for the conference. Communication protocols were necessary so that new comers to CMC had guidance on how to conduct themselves online. In addition, guidelines were posted for student moderators who would take over the moderation of the conference after the first three weeks. At the end of every week, during the first three weeks, all introductions were acknowledged by the moderators so that students who introduced themselves felt welcome and a part of the Globaled community.

In order to facilitate collaborative learning and discussion, the faculty decided that the Globaled project would include both research and discussion components. The research project was designed as a collaborative learning project which each class conducted as a group at their own site. The discussion component involved a discussion of findings from each group project with the online community. Since previous experiences with computer conferences had shown that students are not likely to participate in CMC discussions unless the conference is a class requirement and related to the class topics, each faculty member decided to make the conference part of the required class activities and integrated the research project as they saw fit. The research project was based on the "Principles of Best Practice for Distance Educators" developed by the National University Continuing Education Association. Each institution was asked to select either the principles related to "learning experiences" or "instructional design," and interview distance education faculty and students on their views related to these principles, synthesize the findings, and post their synthesis to be discussed by Globaled participants. Each institution could select how they carried out the research project. It was hoped that by focusing on just one or two topics, Globaled participants could compare and contrast their findings related to the chosen topic across institutions. Each university was assigned one week to moderate the discussion on their research project online. The UNM students started moderating the discussion during the fourth week of the conference, and was followed by OU, TAMU, UW-Madison, SDSU and UW. During the final two weeks of the conference, students were asked to post their reactions to the Globaled conference, focusing on what worked well, what did not work well, and suggestions for improving conferences of this nature. Globaled will be discussed in the following sections from the perspectives of institutions that participated in the computer conference.

A Perspective From the Technical List Administrator

Rosanne Hessmiller

Globaled, was technically a listserv running on a Bitnet node and was maintained at the University of New Mexico. The eight universities participating in the project made a joint decision to make Globaled a "closed" list, by disabling random subscription, thus allowing the professors to better monitor their students' performance and research. The list administrator was given the task of reviewing all requests for participation, rejecting those not actively enrolled in the project, and manually subscribing those that were. Individuals not enrolled in the project were sent a personal message from the administrator inviting them to submit a formal request explaining their research interest. Several individuals did in fact submit proposals and were accepted.

Participants at each of the eight universities had access to two or more computer platforms for electronic communication (i.e. CMS, VMS, UNIX, etc.). At the beginning of the conference, instructions were posted on how to subscribe to Globaled from different platforms. One of the major problems was related to subscribing to Globaled. While some students did not understand the distinction between the several platforms that could be used to access Globaled, others did not understand the concept of a listserv. Many Globaled subscribers came in on one platform, (e.g., a VMS account address) but later attempted to communicate with the list using their UNIX account addresses. The listserv, unable to recognize their addresses, rejected their posts; leaving many students confused and frustrated. A few students never quite grasped the difference between sending messages to the listserv address or sending messages to the actual discussion list. Participants at several universities were distance learners within their own state, in addition to participating in the Globaled project. Computer systems operators at these universities had to try several different addresses before finding successful entries for these isolated learners. Finally, during Globaled's implementation, computer systems at several universities underwent housecleaning, remodeling, redesign, and repair. This often invisible process caused no end of delays, bugs, pauses, and confusion leading the administrator to ask on more than one occasion, "Is this my problem...or your's?".

Throughout this process, many students, lost, uninitiated, or technically stumped would post their distress or hello messages indiscriminately. This frequently resulted in topic stray and multiple screens of distracted discussion. A listserv offers a wonderful service to individuals interested in a forum for a particular topic. However, for a project with the complexities of Globaled, conferencing software may be a better choice. Conferencing software could be set up to offer the newcomer information, practice, and updates, arrange the discussions based on topic, have a separate space for social interaction, and set aside a place for much needed ongoing technical support.

Globaled At The University of New Mexico

Charlotte Gunawardena

At UNM, Globaled was integrated into TLT 535: Theory and Practice of Distance Education, a face-to-face graduate class that explored topics related to theory, the distance learner, distance teacher, learner support, course delivery systems, evaluation, policy, administration, and research. Globaled, was a required class project accounting for a significant portion of the class grade. There were 15 graduate students enrolled in the class. The research project assigned for Globaled, enabled students to explore issues related to the distance learner further and participation in the conference gave them direct experience with a course delivery system. In order to integrate Globaled, during every class session, half an hour was devoted to discussing the conference topics, dynamics and technical problems. This enabled students to see the relevance of Globaled discussions to local issues, examine discussion threads further, analyze the impact of a listserv for group discussion, and vent their frustrations about the conference. One of the topics we discussed in class is the balance between "structure" and "dialogue" in distance education course design. The Globaled experience provided an excellent example for this discussion. In fact, as an overall moderator, I gave the initial structure to the conference, but let the student moderators take over as the conference discussions started. One student thanked me for "letting the conference run its course-to see what would happen," and others felt that there should have been more structure to avoid discussions on unrelated topics. This issue engendered a live debate.

In order to conduct the Globaled research project, the class was divided into groups. One large group conducted the research project, a smaller group synthesized the results and the moderator posted it online and moderated the conference for the assigned week. Each student in the larger group interviewed one faculty member who had taught at a distance and one distance learner on the principles related to "learning experiences." Some of the interviews were conducted face-to-face, some over the phone and others online. UNM was the first to moderate the conference and this was an advantage as the moderator was able to keep the discussions fairly task oriented. Several interesting discussion strands emerged which were summarized by the moderator at the end of the first week. The moderator performed the task of knowledge building by synthesizing the strands of discussion and directing questions for future consideration.

Technical Training

At the beginning of the semester, two class periods were devoted to training students in a Macintosh computer lab to use e-mail and subscribe to Globaled. The List Administrator assisted the instructor in this training and served as the resource person for solving technical problems. Students also had access to computer consultants at the campus data communications center. The concept of a listserv was explained and we discussed the distinction between subscribing to a list and posting to a list. Students were encouraged to work in groups so that the more experienced students could help novices with e-mail. Although no formal groups were formed, most of the novices worked together and a few experienced users coached and helped them with the technical problems. Peer learning therefore, supported the novice user. Some novice users had problems subscribing to the list as their subscriptions were rejected. These students were extremely frustrated, but through perseverance and the assistance of the List Administrator and the instructor, got online and went on to be fairly regular contributors to the conference. At the end of the conference, it was clear that it was the novice users who had benefited the most from the conference. Once they overcame the initial technical difficulties and frustrations and saw the potential of the medium to connect globally, they became enthusiastic. As one student observed: "Being a first user of e-mail, Globaled was like learning a foreign language. You want to talk and no one is understanding you, because no one is getting the message. You are not saying it right. Very frustrating... But, once you are able to communicate, what a reward! a motivator!, the technology becomes the positive reinforcement."

Learning, and Group Dynamics

Student reactions to the conference indicated that it was a positive experience for most of them in spite of the technical difficulties they experienced. A majority indicated that they "enjoyed meeting people from around the world and hearing their perspectives on distance education." The discussions on the research project, however, became repetitive and boring. Since only one or two topics were addressed, after the first two universities had moderated their discussions, the issues became repetitive and the Globaled participants lost interest. However, as a result of this, the conference expanded into topics of group or personal interest; some very relevant and some tangential, but overall a great deal of incidental learning took place. As one student observed: "What I found interesting was that as the conference became repetitive and boring, the group took over to liven it up with humor, social messages, and other topics. We became a community with roles..." Another observed: "This turned out to be the most interesting part because you could get to know personalities, feelings, passions, questions, etc., beyond the academic exercise... The experience has broadened my communication paradigm considerably - now I'm interested in things like gophers, and veronica, for example, that I never would have imagined before." Some students commented that it was easier to enter into conversations on CMC, than in face-to-face contexts because there was time for input. Another found the medium to be quite "personal" and "interesting." A student from PSU observed that there was a "strong sense of community that has developed in this group" and this was evident in the number of students who lamented the ending of Globaled, and wanted to continue the discussions in "Eternaled," the sequel to Globaled.

On the negative side, information overload frustrated many participants. One student from PSU pointed out that there were 9000 lines of text generated during September, and 10,361 lines during November. Access to computers were a problem for several learners, and although labs were available, many adult learners found it difficult to fit their schedules to work in the labs. Novice users pointed out the need for sufficient practice with CMC before they contributed to the listserv, and pointed out the need for feedback from participants to the individual messages posted online. One student wondered why many of the members did not post messages and whether people would have naturally contributed in the same way if it was not a course requirement.

Suggestions for Future Conferences

Suggestions for future conferences include: a) managing information overload by using a conferencing system based on groupware, rather than a listserv, so that several strands of discussions could develop, with a separate space for social interaction; b) not using the same topic for research projects at participating institutions; c) providing adequate time for novice users to be comfortable with the technology before participating; d) encouraging novice e-mail users to work with more experienced peers; e) distributing a list of participants so that private messages can be addressed to individuals and not to the list; and f) if possible, providing convenient access to computers.

Globaled: The Wisconsin Experience

Chere Campbell Gibson

Unlike the other institutions participating in Globaled, the University of Wisconsin-Madison's course was offered solely via computer, thus Globaled offered an opportunity to interact with additional faculty and students rather than an occasion to experiment with a new medium. The graduate course which incorporated Globaled was entitled "The Adult Independent Learner." with the focus on exploring self directed and distance learning with the use of CMC providing an opportunity to explore the content through readings and personal experience. Twelve Masters and doctoral students were registered for the class which was kept small to ensure adequate student support for our first (CMC) course. As discussed earlier, each University was to use a common set of questions which served as a basis for data collection and analysis. The University of Wisconsin-Madison students served as respondents given their personal experiences in distance education in the class. They responded to the questions online, Globaleders summarized responses to two-three questions each and forwarded their section summaries to a single student. This student made limited format and editorial changes and forwarded them to the total conference for discussion. One student, who was identified as particularly adept at communicating via computer mediated conferencing, was assigned the responsibility of moderating the Wisconsin week. A different student was asked to summarize at the end of the time period.

Technical Training

Training included initial instruction in a computer lab equipped with both PC and Macintosh computers. Each student had an opportunity to work with the communications software on a computer somewhat similar to their own to experiment with loading software, composing, sending and receiving messages. In addition to the initial training and printed resource material, a HELP line was available 24 hours a day through the University and a project assistant assigned to the class was available from 8:00 am to 10:00 pm each day. Students also provided support for each other with many helpful hints shared via the NET in the early weeks of the class.

Impact on Student Attitudes and Learning:

It is difficult to separate Globaled from the larger class but overall students described being "engaged in the content" yet noted "humor and side dialoguing is very important." They noted the "personal sacrifice" in terms of time and effort to master the process but the "elements of motivation and intrigue" plus "stubbornness" were factors which kept them on task. They commented that "at times I feel like I'm attached to this machine (computer) and at other times I tell myself - why are you letting it rule you?" indicating a love-hate relationship, but still they continued. Echoing the comments of many, one student wrote "At times I have felt frustrated (mostly at the beginning), but then once the process was 'mastered' I find now that I am thinking more about the content than the process." But the content via computer mediating conferencing became a challenge as well. Students spoke of the need "to actually trust themselves to learn," the importance of "internal conversations" and "expanding one's repertoire of learning strategies," as well as the good feelings "to have acquired this capability (functioning in computer environment) both physically and mentally." But as one noted - "The most important thing I leave with is a reaffirmation of how a group of intellectually active people can squeeze incredible ideas through almost any medium... I look forward to marching together into that golden sun of Eternaled."

Dynamics of the Conference

The dynamics of the conference are difficult to describe and really do them justice. Information sharing was wide ranging from discussions of modem types, availability and costs to potential dissertation topics and related readings. Knowledge building was certainly in evidence, but the aspect of perspective transformation mustn't be overlooked. The linking of students from eight universities across space and time provided a variety of perspectives on almost every topic which emerged. The debate became intense at times with reflection evident in many postings. This sharing of perspectives and philosophies made for a very rich conversation and experience. Not all the Wisconsin students participated in Globaled (only 6 were online but all were active!) The value of Globaled was evident when the Madison students began to not only forward some of the Globaled communications to those Wisconsin students who were not online and also recount online conversations as part of our own class' ongoing discussions. The social cohesiveness was probably variable, but it was exciting when one of the Madison Globaleders and one from New Mexico linked up in person as the Wisconsinite headed west to California on business - cause for a bit of celebration and light hearted discussion online.

Guidelines for the Future

One key is to establish student competency with CMC early to avoid the frustration in evidence with those students who took weeks on end to get online. Rather than a common set of research questions and responses, I would suggest a common reader with a "reading of the week" which could serve as the basis for discussion both within individual universities and across Globaled. While not easy, given the diverse content of our individual courses, it would, I believe, sustain interest to a greater extent than a constant consideration of responses to a common set of questions. Responsibility for perhaps providing key points in the reading, moderating the discussion and summarizing the discussion could be assigned to a different university each week. Lastly, more faculty participation!

Globaled at the University of Wyoming

John Cochenour, Landra Rezabek

Integration and Technical Training

The Globaled experience was integrated into ITEC 5480: Short Course in Computer-Mediated-Communications, an on-campus graduate course at the University of Wyoming during the fall 1994 semester. Eleven graduate students with backgrounds in adult education, instructional design and technology, elementary and secondary education, and/or distance learning enrolled in this course that focused primarily on using the Internet as an electronic resource for distance learning. The primary goal of the course was for students to investigate and learn strategies for accessing and using CMC on available computer networks, specifically the Internet. The Globaled experience was integrated to provide students with a real-world opportunity to use CMC.

Since discussion of distance education issues, per se, was not the primary focus of the course, Globaled perhaps was perceived by some students as a secondary aspect of the course. However, some students indicated that the CMC experience was the most valuable aspect of the course and participated enthusiastically. UW students did not have the classroom focus on issues pertaining to distance education that many members of other classes did, and they were perhaps at a slight disadvantage when the Globaled discussions included theoretical statements and references to current readings and scholars. However, UW students certainly had opinions, and they talked about distance education issues in addition to their course focus on Internet and electronic learning resources. Were UW students and faculty to participate in Globaled again, instructors would prefer to include it in a course more focused on actual theory and practice of distance education.

The course was held in a classroom where each student had individual access to an IBM clone with direct access to the UW Internet connection. All of the students also had Internet access at home or in their workplace using modems, communications software and either Macintosh or MS-DOS platforms. A few of the students were more proficient in electronic mail communication than either of the instructors; most had only limited experience with e-mail or other online activities. At least one had never been exposed to computer networking or telecommunications before. The first four sessions included extensive collaborative training on e-mail and networking for students, with experienced students serving as guides and mentors for less experienced peers in addition to "formal" classroom training on Internet use. As the course progressed, new skills were presented and practiced as the need arose. Technical expertise and comfort using e-mail is definitely a prerequisite to successful participation in Globaled.

As mentioned above, the primary focus of the course was not on general distance education issues, so UW student participation in the Globaled discussions paralleled the main issues of the course. Most students indicated that they benefited from and enjoyed the experience and that they gained valuable insight into the actual processes and procedures of interacting using electronic mail.

Student Participation and Dynamics

Perhaps the main benefits from the Globaled component were manifested when the UW classmates were responsible for designing, conducting, and presenting findings from the mini-research project described elsewhere. An unexpected benefit from Globaled participation was an intense and very beneficial review of basic research procedures and methodologies. Many students were at the point of contemplating their own master's or doctoral-level studies, and the discussion regarding what to do for the Globaled mini-study was extremely worthwhile.

Students struggled to come up with a question that they thought was different from the others that had been asked. They decided to ask two questions based upon and reacting to data collected from their survey on perceptions of distance education learning experiences. The first question asked Globaled participants to describe alternatives for assessing the performance of distance students. The second question asked Globaled participants to provide lessons they had learned about doing survey research, especially research regarding distance education.

In addition to formulating the discussion questions, UW students discussed research options and ways of presenting the data to their CMC colleagues. Although UW students were somewhat disappointed with their methodical choices and the ensuing research results, they found the process of engaging in a real world research effort rewarding in many ways. They all commented that the experience had been eye-opening and a good "warning" for what lay ahead for them as researchers.

Another interesting outcome from Globaled participation was the fact that UW students often talked more to each other during face-to-face class about comments that had been made on-line than they interacted with their CMC colleagues. Students complained of "CMC burnout" with too many comments about too many topics coming over the line. The two students who posted and moderated the UW discussion questions based on the mini-research project attempted to be directive and focused, but they soon became discouraged and lamented the scattered nature of the interaction. Though Globaled comments indeed were at times frustratingly difficult to follow, this fact seemed to gel the on-campus UW students who brainstormed ways to keep CMC discussions on-track and yet to allow for interaction and diversity. Though the attempts actually failed during the time when UW student volunteers moderated the conference, students still talked about how they would conduct their future computer conferences.

It was also interesting to observe how some UW students became active participants in Globaled while others opted out of the CMC discussions. Some students were extremely excited and became more participative when, near the end of the Globaled experience, the interaction became more personal than professional. This social turn bored and disinterested others. Not surprisingly, instructors noted that student interaction patters using CMC in most instances mirrored their behaviors in the face-to-face classroom .

Recommendations

As indicated above, the students and instructors believe Globaled experiences were very beneficial and would choose to participate again. However, one caveat has already been mentioned: include Globaled in a course specifically focused on distance education issues, if possible. Students would then have had a better foundation for discussion and participation. Students and faculty also complained of "CMC overload" and lack of focus for the discussions. A common observation during face-to-face classes was that perhaps the number of participants was just too large and that sheer numbers of messages contributed to these two problems. The size of future Globaled endeavors may have to be limited. Students also suggested establishing sub-conferences on specific topics to focus the interaction. In addition, students felt that the scope of the research projects and student-generated questions was too narrow, resulting in tedious re-discussion of issues. Globaled faculty could remedy this situation, by broadening the scope of the research projects. The greatest benefit of Globaled participation was the participation itself. Students experienced first-hand the benefits and frustrations of CMC and embraced it as an educational option. If available, students and faculty would most certainly participate in Globaled again.

A Perspective From The University of Oklahoma

Connie Dillon

The University of Oklahoma students who participated in Globaled were students enrolled in an introductory graduate level course in instructional telecommunications. The class consisted of 15 students who were enrolled in educational technology and adult education graduate programs. The first half of the class was devoted to an analysis of the predominant telecommunications technologies and the second half of class was devoted to the design of telecommunications systems. The class utilizes primarily instructor-centered approaches including lecture and class discussion. Students are assigned readings and video taped materials. Student projects consisted of a take home midterm, a final which requires them to design an instructional telecommunications system, and journals. In addition, the Globaled project is designed to provide students with experiential experience with the use of telecommunications technologies in instructional settings. The Globaled project was organized as a computer discussion and progressed throughout the semester. The purpose of the Globaled experience for this class was to provide students with a telecommunications based distance learning experience.

Technical Training

The first three weeks of class were devoted to training students on the University's computer system. The university has two computers, an IBM 3081 which runs on an MVSA operating system and a Vax. Students were taught to logon to TSO and enter the mail system which provides access to Bitnet mail. We also learned to access Internet using the VAX system. The first class period was devoted to sending, receiving and printing messages from each other. During the second class period students worked to subscribe to the Globaled listserv. Due to a variety of technical problems, the class required a third meeting in the computer classroom. The university added new computer terminals during the summer session. Although I had held many classes using the old terminals, I was not familiar with the new terminals, and did not know they had been changed until the first night of class. We had a variety of difficulties with the new terminals. Most significant were the different keyboard inputs required and some of the instructions provided were not yet accurate. We also had difficulty connecting to TSO on these terminals and instead began to use the Vax to connect to the Internet. To complicate matters, we could not determine which address we were to use to subscribe to the listserv. With help from the technical coordinator at UNM, and OU's computing services, we finally got the majority of students subscribed by the third week. Needless to say the first few weeks of class were extremely frustrating for all and I feel that the difficulties impacted the students' enjoyment of the experience.

Organization Of The Conference

During the first few weeks of class, each student was required to introduce themselves and then describe their classes. At OU, the research project was designed as a collaborative exercise in which students were placed into five groups of three each. The groups were organized to provide a diversity of experience within each group. For instance, I attempted to mix students based upon institutional experience, i.e. community college, university experience; and system experience, i.e. telecourse with interactive television experience. The students had a common list of questions which served as the basis for interviews. The population for the study included teachers who taught via distance education and students who received courses using distance technologies. Each student identified a distance teacher and a distance learner to interview outside of class. During class the students analyzed the responses and prepared a paper. Each of the five papers were given to a student who volunteered to synthesize the materials provided from all groups. The student synthesizer posted the synthesis for group discussion. Another student volunteered to moderate the discussion.

Dynamics Of The Conference And Suggestions For Improvement

A few students from the OU class responded consistently, however most students only participated as observers. Many of these students commute to OU from some distance away. Only a few of these commuting students had access to personal computers and modems. Those who had PCs and modems, were prevented from participating online due to telephone charges. Most of the students who participated actively in the conference had free access to the network and had the necessary equipment at home. The students without access to equipment at home generally went to the university computing center before class and printed all the messages. They would read the messages prior to the next class, but by the time they were prepared to participate in the discussion, the discussion had moved on. The number of messages exacerbated their difficulty in keeping up with the conference. Just reading the messages required several hours each week and often it was hard to follow a single discussion.

A content analysis of the student journals submitted at the end of the project identified some of the key positive and negative reactions to the conference. Students identified the following as barriers to participation. Technical barriers included: 1) the unfriendly platform provided by TSO software; 2) technical problems associated with the use of university terminals and compatibility of OU and UNM mainframes; 3) access to equipment at home or difficulty with interface between personal computers and the university system. Conference barriers included: 1) information overload and 2) difficulty following a variety of computer conversations.

Positive features of the CMC experience included 1) experience with the Internet; 2) interacting with students across the US and around the world; 3) being introduced to the potential of CMC; the asynchronous system allowed for thoughtful discussion and time to mull over ideas. Suggestions included the need to reduce the number of participants and to provide a means to encourage within site discussion and participation.

Globaled at Texas A&M University

Karen Murphy

The unique aspect of the Globaled experience for the graduate class in distance learning at Texas A&M University (TAMU) is that the eleven students were at three locations and communicated primarily by videoconference (Trans-Texas Videoconference Network, or TTVN), which is two-way real time video and audio transmission by compressed video. While all of the teaching occurred at the host campus at College Station, seven students were at College Station, three students were at West Texas A&M University

(WTAMU) in Canyon, and one student drove two hours to take class at Texas A&M University at Kingsville (TAMUK), in the Gulf Coast area. The very structure of the class and the newly formed infrastructure of the TAMU System posed technological and pedagogical challenges for the students and instructor alike.

Class Structure And Technology

Pre-course surveys revealed that while one student had used listservs and another had been an avid BBS-user prior to the Globaled semester, most had little or no previous conception of CMC. As the instructor was new to the university, she was unfamiliar with the arrangements at the various locations. This lack of experience was compounded by delays at WTAMU during the installation of the campus network, and by a total lack of support for the student who worked at a community college and accessed the TAMU mainframe through TAMUK. One student teaching in a rural district in the Texas Panhandle confronted further technology challenges: She was limited 45 minutes per day logon time to the Texas Educational Network (TENET) and had to use the superintendents office after work. Challenges notwithstanding, one student commented in her CMC journal that "perhaps a special kind of bond occurs when people refuse to be defeated by technology."

Integration of CMC and Technical Training

All TAMU students were required to participate in at least two listservs -- the local one designed only for the members of the class, and Globaled. CMC assignments were designed to promote collaboration among students regardless of their location. The students used the local listserv to extend the class meetings informally, to moderate discussions that followed their collaborative technology-related presentations, and to conduct the research for Globaled. They were also responsible for keeping a journal of their CMC activities throughout the semester. These activities were worth more than one-third of their final grades.

Training on CMC was presented formally in two stages. At the first class session, which was conducted by compressed video, a graduate assistant conducted training and distributed a specially prepared overview of computing services at TAMU. The document included access, resources, logon procedures, communication and networking, communication with campus mainframes, and the library database system. At the second class session, the same graduate assistant presented an overview of CMC and logon procedures for the two required listservs. The students found this training "inadequate, too hasty, and too superficial" and relied on each other for assistance. Students sought help from "experts" and shared their frustrations and findings at weekly in-class "lessons learned" sessions. They even used class breaks and telephoned each other between class sessions to discuss specific technical aspects of CMC.

Conducting Group Research

As a group, the students selected six statements from the "Learning Experiences" section of "Principles of Good Practice in Distance Education." Each student then conducted interviews about the six statements with three individuals: a distance learning instructor, student, and one other of their choice. These interviews were conducted in a variety of ways (face-to-face, telephone, and e-mail). Each student volunteered for a role in the Globaled project. The roles involved synthesizing the interview summaries, posting the results to the Globaled listserv, and moderating the discussion that followed. Because of technical glitches, the student who synthesized the summaries had to use fax to communicate with the student who posted the synthesis to Globaled. The two students responsible for moderating the discussion prepared their questions through the synchronous "chat" mode several times. As TAMU was the fourth class to present its research findings and moderate the discussion, input from other Globaled participants was limited. Even prods that week on the local listserv prompted little response to Globaled from TAMU students. As one of the moderators noted in his journal, "The volume of messages seems to have finally dropped off (great, it couldn't have waited another week to do that). I can't figure out if it is our questions or [if] others are suffering from mid-semester burn-out like we are."

Effects Of The On-Line Environment And Guidelines For The Future

Participation in Globaled, in conjunction with the local listserv, sparked information sharing, a healthy respect for the potential of communication on-line, and social cohesiveness among the TAMU students. Once the students overcame the barriers to posting to the Globaled listserv, they paid attention to both the process and content. One student commented, "I spent time experimenting with different message formats to see how other people would respond. I noticed that discussions seem to flow better when they circle around one topic, rather than the variety of topics presented in Globaled." Another student noted that "...we didn't settle many issues although I did notice some changed their positions along the way." The same student began to exchange reference materials about video with a Globaleder from another university and made an analogy with face-to-face classes: "The wide discussions were useful as I discovered some common interests and corresponded with them directly. It is sort of how you make friends by discussing common interests over the break during a formal class."

The potential for on-line communication was apparent to all of the students. The students cited a wide array of current and potential applications: continuing professional education, linking people whose training is "reflective and case-sensitive rather than information-laden," high school students' access to listservs, teaching entire university classes via CMC, a videotape distribution system, and training classroom teachers on CMC.

The students' shared frustrations and problem solving strategies with the technology, helped them develop into a cohesive group. They felt "a stronger connection to the 'distant' members" and recognized that the way CMC was used "helped bond the class." One student encapsulated the sentiment of many: "In the final analysis, we rose above the technological problems to get to know each other in a common cause. I judge it to have been an extremely fruitful experience."

Guidelines for the future include: a) post the important messages prior to the first class session of any participating group each week. b) provide a participant roster, including interests, c) provide quick feedback to individual users regarding their technical problems.

Globaled: The SDSU Experience

Farhad Saba

Twenty students participated in Globaled at San Diego State University. They were enrolled in EDTEC 553, Educational Television. The course is designed for students to learn about the applications of video in instruction, develop an understanding of the role of educational television in schools and in the world of work, and be able to write a video script, and produce it. Globaled was added to the course to provide a forum for students to expand their understanding of distance education, and computer mediated communication CMC. Students in EDTEC 553, are generally in the middle of a 30-credit hour Masters of Art program in Educational Technology. About 50% of them are school teachers and the other half are training professionals in the private sector, in social service agencies, or in the armed forces. Of 18 students who responded to the Globaled questionnaires, 10 were female and 8 were male. Unlike other participants in Globaled who collected data on the "Principles of Good Practice," EDTEC 553 students did not have access to distance education practitioners. Unfortunately, during last year's budget cuts at San Diego State University, the distance education program offered by the College of Extended Studies was reduced to an embryonic organization. Therefore, students were instructed to study the

"Principles," select one of the topics in which they were most interested, form small groups, and discuss their topic in the small group meeting. Each group was instructed to select a reporter. The reporter was tasked to summarize the results of the group discussion, and present the summary to the student who volunteered to be the moderator for SDSU. The moderator, was instructed to post the discussion results during the week in which SDSU hosted the conference, and invite everyone including SDSU students to respond to the summary comments.

Technical Training and Student Participation

Students in the SDSU, EDTEC program are introduced to e-mail and listservs in one of the first courses they take in the department. They all receive an account on a mainframe computer and are encouraged to use e-mail to communicate with the faculty. Very few students needed hands-on experience in joining a listserv and participating in it. Barring usual problems such as expired student accounts; using up disk allocations, due to poor file management practices; and confusion in distinguishing between a Bitnet and an Internet address among a few students, everyone was able to subscribe to the Globaled listserv, and post their profile to introduce themselves to the rest of the participants. The project had a relatively smooth start.

At the beginning of the Fall Semester, 1993, enthusiasm for participating in Globaled was high among students. Although they were not certain about how others would react to their contributions, I observed a relatively high volume of traffic during the first two weeks of the experiment. As more students began to participate from other universities, however, SDSU participation slowed down and came to a halt. This was partially due to a software problem on the mainframe, which would not let listserv messages pass through. At that point, I attributed the low participation to the software problem. Once the problem was corrected, it was evident that there were other antecedents for the low level of participation. Messages from other campuses, as well as from SDSU, indicated that information overload was taking over and fatigue was setting in.
During the week that SDSU hosted the conference, there were more participation from EDTEC 553. The SDSU moderator, reacting to the information overload factor, developed a style of writing in summarizing the week's participation. He reported the results in a few short sentences, instead of a lengthy summary. He received several supportive comments on his style of summarizing and reporting. As the semester drew near its end, and students' video projects reached the editing stage, SDSU participation dropped again and moved towards zero.

Student Reactions to the Conference

Results reported here are limited to the soft data collected at the end of the semester in the "Globaled Questionnaire," designed by Dr. Gunawardena. Other data collected in the "Globaled Questionnaire," and three other instruments have not been processed at the time of this writing. The soft data were in response to three questions: 1) What did you learn from Globaled? 2) If you would like to change one thing about Globaled, what would it be? 3) If you would like to keep one thing about Globaled what would it be?

In response to the first question, except for one respondent who indicated s/he has learned "nothing" from Globaled, everyone indicated that they all learned from the experience. Opinion about what they learned, however, varied. For example, students observed: "I got a much greater perspective on what Globaled entails. I found my own view to be rather narrow." " I liked learning from people all over the world and 'listening' to what they are learning in other areas." "The medium facilitates stimulating discussion." Others noted that they learned of "the different applications of ed. tech. at a distance that are being experienced by my peers in different academic settings," and "how not to write a mail system."

For the second question, there was almost unanimous agreement on two issues: 1. A listserv did not provide the most appropriate interface for following threads of discussion, and responding to themes which emerged through the conference, and 2. The number of messages was overwhelming and caused information overload.

The third question asked them to give their opinions on what to retain for future conferences. Interestingly, although students complained about information overload, they also found the geographic dispersion of participants a strong feature of Globaled and wanted to keep that feature. Several students suggested forming smaller groups with "pen pals," and "peers" in other universities would be more beneficial than participating in a large group.

Suggestions for Future Conferences

My overall impression from student participation and reaction is that Globaled was an interesting, useful and informative experience. It supported the concept of computer mediated communication as a powerful means of learning on a global scale. At the same time, it reminded us of at least two considerations:

1. much remains to be done in creating a more appropriate interface for CMC. For example, at SDSU, we use VAXNotes for CMC, which is more user friendly than a listserv. However, VAXNotes is not free of problems either.
2. There is an economy of scale in CMC. Although the optimum number of participants for a successful conference is yet to be determined, it is clear now that a relatively large group creates information overload and reduces the level of motivation to participate.

CMC - A Legend In Our Own Minds: A Perspective from the University of Wollongong, Australia

Tony Dean

Living on the east coast of Australia, the author was a remote participant in Globaled. This paper is not so much a recount of the events conducted in the project but is, rather, a discussion of a phenomenon that was observed from a vantage point some 20,000 kms away on a different continent and from within another culture.

The phenomenon in question was, perhaps, transparent to the other participants given their location, and immersion, in American culture. The implications of using idiomatic and colloquial language in cross-cultural CMC in distance education are discussed before the paper concludes that they have a place so long as the keys/codes for deciphering meaning are also provided. Without a set of clues to decode what has been said, the observer (in this case the reader) will only understand a portion (if any) of what has taken place.

The crux of this issue as it relates to Globaled exists for the author in one word: 'tarheel'. Apparently the word is not in need of explanation to Americans but it was used within the Globaled conference and to the author it was arcane and it thus rivals the language used in the opening excerpt because there was no key to decode its meaning. From that one word (subsequently elaborated by other contributors) came the stimulus to think about:- the assumptions and expectations that participants of CMC may make, and have, in communicating their thoughts and the implications that such a small example can underscore for the use of CMC across cultures.

The purpose of this paper, then, is to seed some ideas about the 'importance of being earnest' in our attention to facilitating meaning, by providing the codes necessary to promote understanding of written language, especially in the context of CMC. One approach that could be taken is to adopt language within CMC that is devoid of 'color' and ambiguity in much the same way that 'MusakTM takes the highs and lows out of music. The downside with this is that it could be so bland and colorless as to amount to a denial of culture.

An alternative is to proceed, as is, making the assumption that the receiver has to make the effort to 'come to the party'. Preserving the status quo obviously has a place when the idiomatic context is widely understood as was the case with the predominantly American participants of Globaled. The same could be said for Australians hearing the opening dialogue. Another alternative is to recognize that there is a place both for CMC (Globaled is sufficient evidence for me) and for the use of 'culture rich' language, so long as the explanation accompanies the text.

My preference is skewed towards the latter option when the audience is cross, and/or multi, -cultural. I now know what is meant by 'tarheel' and I have gained some appreciation of the geography of the southern states of America, of the restaurants frequented by the conference participants and of the football teams emanating from the regions populated by the Globaled participants.

My own research interests have benefited from my involvement in the conference and I have expanded my personal network of people sharing similar interests. The content matter of the conference provided much stimulation and the project raised, for me, a number of questions. I have attempted to address one of those in this brief paper.

Globaled is a harbinger of things to come. When we consider NREN, globalization, information highways, converging technologies, increased need and demand for higher education, evident increases in wholly on-line degrees, the continuing search for viable alternatives to 'bricks and mortar' based education, the move towards for life-long learning and the arguable need for massive improvement in cultural understanding and tolerance, CMC is an option that deserves further development and evaluation.

Until the picture can paint the thousand words we are dutibound to choose wisely the thousand words to paint our picture. The wisdom will be found in the right choice of words to project context, content and cultural character without disenfranchising the recipient by neglecting to include the legend or code to interpret the language. So, should you wish to know what sandgropers, crow-eaters and banana benders represent; if rhyming slang or strine take your fancy or if you'd like to know what a kangawallafox is, then look out for a discussion list that comes complete with a map and a legend.

Guidelines for Future Inter-University Collaborative Projects

The discussion from several institutional perspectives indicates that overall Globaled was an interesting, worthwhile, and informative experience. It supported the concept of computer mediated communication as a powerful means of learning on a national and global scale. For students in distance education, it gave them the opportunity to connect with peers at other institutions and hear different points of view. The technical system challenged them to examine issues related to distance delivery systems and prompted the discussion of how different media impact the communication process. We believe that projects like Globaled expand horizons for students, and should be considered as enhancements to traditional classroom as well as distance teaching.

We would like to offer the following guidelines for those interested in organizing future projects of this nature.

1. A listserv was not conducive to conducting a group discussion on the scale of Globaled. Although the listserv enabled us to connect several institutions in the U.S. and one in Australia, its inability to set up separate areas for the discussion of different topics, or show the connection between threads of conversation, became a barrier to collaborative learning. Conferencing systems based on groupware, rather than a listserv, would be more conducive to collaborative learning via this medium, so that several strands of discussions could develop, with a separate space for social interaction.

2. Although the optimum number of participants for a successful conference is yet to be determined, it is clear that a large group such as the one participating in Globaled,

creates information overload and reduces the level of motivation to participate. Limiting the number of participants on a listserv may generate more focused discussions.

3. Discussion of the common research project conducted by the participating institutions became repetitive and boring. Rather than a common set of research questions and responses, it might be better to use a reader with a "reading of the week" which could serve as the basis for discussion both within individual universities and across Globaled. Responsibility for providing key points in selected chapters, moderating, and summarizing the discussion could be assigned to a different university each week. Another technique that worked well with the 1992 Globaled project was to have each university generate the question they wanted to moderate online.

4. A period of one week for the discussion of a specific topic online was too short. A topic should be discussed for at least two weeks so that all would have a chance to contribute and not feel left behind.

5. Provide adequate time and support for novice users to be technically competent and comfortable with the technology before subscribing to the listserv.

6. Encourage novice e-mail users to work with more experienced peers by setting up a buddy system, or encouraging students to work in groups. Experienced e-mail users could be given extra credit for helping new users.

7. When integrating a CMC conference into a traditional or distance class, see that there is a good match between the class topics and the conference topics, so that students feel confident to participate in the discussions. It is also important to allocate time at each local site to discuss the CMC conference either in a face-to-face setting or through a local distribution list so that students see the relevance of the CMC conference topics.

8. Strike a balance between "structure" and "dialogue" when designing a CMC conference. Decide which components will be structured and which components will be unstructured. This is important if the CMC group is very large so that the discussion can be kept focused. The dates for moderators to post assignments should be coordinated with class schedules at participating institutions, and it is preferable if any new posting occurs during the weekend.

9. Individual participants should be responsible for any new thread of conversation they initiate by providing a synthesis of that discussion.

10. When the CMC conference connects people across countries, individual participants must be responsible for providing codes or legends for the idiomatic and colloquial language they use that might only be understood in one particular culture. This should be included in the communication protocols for the conference.

11. Distribute a list of participants and their professional interests, so that private messages can be addressed to individuals and not to the list.

12. Faculty should be actively engaged in conference discussions with students, as one advantage of organizing inter-university conferences is to expose students to different faculty perspectives.

13. If possible, provide convenient access to computers to those who do not have access at home or office, by arranging for lab use during class time or during convenient times for graduate

students. Student participation in the conference will depend on ease of access to the technology.

Social Presence Theory And Implications For Interaction And Communication In Telecommunications-Based Distance Education

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Telecommunication systems that mediate the communication process in distance education create social climates which are very different from the traditional classroom. Even two-way interactive video and audio systems that permit the transmission of facial expressions, gestures, and tone of voice, create interaction patterns different from the face-to-face context. In traditional face-to-face interaction, besides what is actually verbalized, people exchange a range of nonverbal cues such as facial expression, direction of gaze, posture, dress and physical presence. Birdwhistell (1970) notes that these nonverbal cues perform two distinct functions. The first concerns itself directly with the passage of information from one individual to another; the second is the "integrational aspects" of the communication process. Integrational aspects include all the physical manifestations of information exchange that keep the conversation going, regulate the interaction process, cross-reference particular messages to semantic meaning, and relate a particular context to larger contexts. In distance learning integrational activity is the dialogue that occurs between learners and the instructor and among learners.

The importance of examining social factors that impact communication and learning in telecommunications-based systems has been emphasized in recent studies conducted by Feenberg (1989), Hackman & Walker (1990), Sanders & Wiseman (1990), and Walther (1992). One of the theories that has been used in communication research and educational psychology to explain the social context of telecommunications-based interaction is the theory of social presence (Short et.al 1976).

The Purpose of the Study and Methods

The purpose of this paper is to discuss research in progress that examines social presence theory and the implications for analyzing the interaction, communication, and social context of telecommunications-based distance learning. The paper will 1) review literature related to social presence theory, and examine research conducted in both traditional and distance education settings, and 2) discuss two preliminary studies conducted in Fall 1993 that solicited student reactions to computer-mediated communication (CMC), and audiographics teleconferencing. The studies assessed students' subjective perceptions of media characteristics and not their performance in using these characteristics.

In order to solicit student reactions to both types of media, a questionnaire was developed by the researcher using a series of five-point bipolar scales. The seventeen bipolar scales in the instrument solicited students reactions on a range of feelings toward the medium. These included: stimulating-dull, personal-impersonal, sociable-unsociable, sensitive-insensitive, warm-cold, colorful-colorless, interesting-boring, appealing-not appealing, interactive-non-interactive, active-passive, reliable-unreliable, humanizing-dehumanizing, immediate-non-immediate, easy-difficult, efficient-inefficient, threatening-unthreatening, and hindering-helpful. Students were asked to respond to each of the five point scales according to their current feelings about the medium. For each scale, five indicated a negative reaction to the medium, for example "very dull," and one indicated a very positive reaction to the medium: "stimulating." If they were undecided or neutral or thought that the medium was equally likely to be stimulating or dull, they indicated so by circling three, the midpoint of the scale.

In one study, the questionnaire was administered to a group of graduate students from the University of New Mexico who participated in "Globaled," a computer conference that linked graduate students in seven U.S. universities to participate in online discussions related to distance education. In the second study, the questionnaire was administered to graduate students who were enrolled in a class on "Multicultural Issues in Adult Learning" that was taught simultaneously at the University of New Mexico's main campus at Albuquerque and at a distant site in Los Alamos, using both audiographics and CMC. In this class, CMC was used as a supplementary medium. Students used electronic mail to communicate with the instructor and other learners and also participated in a Vax Notes computer conference related to class topics. In the second study, separate questionnaires were used to assess student reactions to CMC and audiographics. Data are reported using descriptive statistics.

Globaled was conducted using a "listserv" which is a large electronic distribution list. Students subscribed to the list electronically, and each student contribution was distributed by the list as a private e-mail message to each individual student. Unlike conferencing systems designed on the principles of groupware, the listserv is not conducive to conducting a group discussion online. The audiographics system enabled the real-time transmission of voice, the exchange of graphics, and still video images of the instructor and participants. The system utilized two phone lines, for audio and data. Data and graphics were transmitted via a high speed modem, a computer, graphics tablet, scanner, a video camera, and a printer driven by Worldlinx software. The system was two-way interactive enabling both sites to talk to each other and share graphics and text in real time.

1. Review of Literature

The issue of social presence may be explored by examining a variety of constructs which may contribute to the social climate of the classroom. Short et.al. (1976) define social presence as the "degree of salience of the other person in the interaction and the consequent salience of the interpersonal relationships..." (p. 65). This means the degree to which a person is perceived as a "real person" in mediated communication. They define social presence as a quality of the medium itself and hypothesize that communications media vary in their degree of social presence, and that these variations are important in determining the way individuals interact. The capacity of the medium to transmit information about facial expression, direction of looking, posture, dress and nonverbal cues, all contribute to the degree of social presence of a communications medium. Two concepts associated with social presence are: Argyle and Dean's 1965 concept of "intimacy;" and Wiener and Mehrabian's 1968 concept of "immediacy" (cited in Short, et. al. 1976.) Short et. al. (1976) suggest that the social presence of the communications medium contributes to the level of intimacy which depends on factors such as physical distance, eye contact, smiling and personal topics of conversation. They observe that the use of television rather than audio-only communication makes for greater intimacy, other things being equal. Immediacy is a measure of the psychological distance which a communicator puts between himself or herself and the object of his/her communication. A person can convey immediacy or non-immediacy nonverbally (physical proximity, formality of dress, and facial expression) as well as verbally. A person making a telephone call may choose to speak in such a manner as to give an impression of aloofness and 'distance' (non-immediacy) or he or she may choose to adopt an attitude of informality and comradeship. Immediacy enhances social presence. Therefore, according to this argument, social presence is a factor of the medium, as well as that of the communicators and the interaction that takes place.

Walther (1992) observes that Argyle and Dean's 1965 equilibrium theory posits that communicators adopt levels of gaze, physical proximity, and other behaviors indicative of intimacy and that these levels are derived partly from cultural norms as well as from a need for affiliation. Short et al. (1976) were aware of equilibrium theory and research although they did not embrace it, and speculated that language may substitute or even "overcompensate" for missing nonverbal information. Examining teleconference research, Short et al. (1976) observed that because of the reduced-cue situation, a participant will modify his or her behavior. Thus head-nods indicating agreement may be replaced by verbal phrases such as "I agree." Equilibrium theory supports the principle of cue substitutability, in that a communicator is likely to adopt other symbol systems to convey affective messages that are unavailable nonverbally. Therefore, Walther (1992) observes that those who communicate with each other using only a text-based medium such as CMC, will try to achieve desired levels of immediacy through the manipulation of verbal immediacy.

Examining the concepts of "social presence" and "interactivity" Rafaeli (1988, & 1990) observes that social presence is a subjective measure of the presence of others as Short et al. (1976) defined it, while "interactivity" is the actual quality of a communication sequence or context. Interactivity is a quality (potential) that my be realized by some, or remain and unfulfilled option. When it is realized, and when participants notice it, there is "social presence".

A large number of studies in communication research focus on examining factors related to social presence in the traditional face-to-face classroom. A study by Kearney et. al. (1985) examined immediacy as a potential indicator of student affective learning across varied course content. The results showed that immediacy was a good predictor of student learning, and that both people-type and task-type students were sensitive to teacher immediacy behaviors. It was observed that students who were enrolled in certain majors were less likely to have been exposed to high-immediacy teachers and thus placed less emphasis on the need for immediacy.

In an examination of relationships among instructor immediacy behaviors, learner motivation, and learning, Christophel (1990) observes that instructor-generated learner motivation can serve to lead learners to arousal and instigative behaviors, give direction and purpose to their behaviors, allow behaviors to persist, and lead to a choice of preferred behaviors. Having examined instructor social presence as a potential predictor of instructional effectiveness, Christophel concludes that perceptions of immediacy are highly correlated with favorable learner outcomes. Instructors with a high degree of social presence were viewed by learners as being more positive and effective, which, in turn, led to increased affect toward the instructor and the course itself.

Powell and Harville (1990) examined how a teacher's verbal and nonverbal immediacy behaviors relate to clarity when the students are ethnically diverse. The results showed differences in the affect of immediacy on clarity for certain ethnic groups, with Asian and Latino students showing the greatest demand for teacher immediacy behaviors. Based on the assumption that relational messages are multidimensional and are frequently communicated by nonverbal cues, Burgoon et al. (1984) examined relational messages associated with nonverbal behaviors. It was found that high eye contact, close proximity, forward body lean, and smiling all conveyed greater intimacy, attraction, and trust, while low eye contact, a distal position, backward body lean, and the absence of smiling and touch communicated greater detachment.

After completing a review of literature related to teacher communicator style, Sallinen-Kuparinen (1992) observes that instructor communicator style constitutes one crucial factor in the teaching-learning process. Stylistic behaviors contribute to perceptions of teacher effectiveness in particular. Furthermore, they account for a substantial proportion of affective learning and mediate cognitive learning. A close association between communicator style and immediacy was empirically verified with "friendly" emerging as the best predictor of generalized immediacy.

In a study that examined the relationship between verbal teacher immediacy behaviors and student learning in a group of forty seven advanced undergraduate students enrolled in upper-division communication classes, Gorham (1988) found a substantial relationship between immediacy and learning. Both the total verbal and nonverbal immediacy scores and the overwhelming majority of the individual immediacy items were significantly correlated with both affective learning and perceptions of cognitive learning. Thus verbal and nonverbal behaviors function together to generate immediacy.

Kelly and Gorham (1988) observe that while the link between teacher immediacy and affective learning is empirically supported, the link between immediacy and cognitive learning is less straightforward. They state that in studies relating cognitive learning to teacher immediacy, cognitive learning has most often been assessed via course grades and less often, by performance on standardized tests. Assessment via course grades is confounded by variables such as attendance, writing skills, participation, student preparation, and perceived motivation and may reflect student compliance as much as learning. In light of these measurement problems, communication researchers have proposed the use of student perceptions of their own learning as a measurement of cognitive gain. Using this measure, associations between teacher immediacy and perceived cognitive learning have been found. Kelley and Gorham (1988) conducted a study to investigate the effects of immediacy on cognitive learning in an experimental situation which removed the effects of affect - that of teacher (experimenter) toward students or that of students toward subject or teacher, from the measurement of cognitive learning. The independent variables were eye contact and physical immediacy while the dependent variable was recall of nouns and numbers. The subjects were 100 undergraduate college students, 53 male and 47 female. The results showed a definite relationship between immediacy and cognitive learning at the short-term recall level. The high physical immediacy with eye contact condition was the only condition in which no subject recalled less than two out of six items. This condition also had the fewest items placed out of sequence. Therefore, results showed that immediacy produced positive results on short term recall. They observe that a teacher's use of immediacy behaviors is likely to be as directly related to cognitive learning as it is to affective learning.

In the distance education context, Hackman and Walker's (1990) study provides evidence that "teacher immediacy" contributes to student satisfaction and learning in an interactive television class. They argue that there are differences between telecommunications delivered instruction and traditional face-to face instruction, specifically in terms of the climate of "social presence" created. Teacher immediacy behaviors include both verbal and nonverbal actions such as gesturing, smiling, using humor, vocal variety, personalizing examples, addressing students by name, questioning, praising, initiating discussion, encouraging feedback and avoiding tense body positions. Rifkind (1992) suggests that the lack social presence in mediated instruction leads to a high level of frustration and that students who perceive a lack of social presence are apt to be more critical of the instructor's effectiveness and to have lower affective learning.

A study comparing the learning of 166 distance students and 170 on-campus students participating in classes offered via the State of Oklahoma's interactive television system (one-way video, two-way audio) found no significant differences in learning regardless of level (lower division, upper division, graduate) or subject (science, social science, humanities) (Dillon, Gunawardena, and Parker, 1992). However, comparisons of the two groups' assessment of the instructor showed small differences, with the mean rating of the off campus students somewhat lower than the on-campus students (3.23 compared to 3.36). The differences are larger than they may appear given the size of the population. Analysis of the open ended responses indicated that the students identified the teacher most often as the factor which either contributed to or hindered performance. Students who indicated that the teacher contributed to performance cited the following factors: willingness to explain things more in depth; taking time to explain concepts more than once; mailing information directly to my home; personal attention from the instructor; site visits by the instructor; and easy access via the telephone. Likewise, the instructor was also cited most frequently as a factor which hindered performance. Typical comments included lack of feedback on assignments; the instructor's boring presentation style; and failure to provide the distance students with the same materials as the on-campus students. Thus the focus of these responses centered on interpersonal communications and social presence between student and teacher, rather than upon the course design or instructional strategies.

A study conducted to examine the interaction of learning styles and the media, methods of instruction and group functioning in an audiographics class, found that in many instances it was class type (whether students were on-campus or off-campus in the same distance delivered class), rather than learning styles, that impacted student satisfaction with media, methods of instruction, learner-instructor interaction, learner-learner interaction, group satisfaction, goal setting, and group climate (Gunawardena & Boverie 1992). The results of this study cannot be generalized because of the small sample in the distance class. However, the fact that a distinction was found between the on-campus and the off-campus learners point to the necessity to examine issues of social presence that may impact learner satisfaction with the communication transaction in distance education settings.

Walther (1992) conducted a comprehensive study of interpersonal effects in computer-mediated interaction, and observed that several theories and experimental research on relational tone in CMC points to the lack of nonverbal cues in this channel as a cause of impersonal and task-oriented messages. However, field research in CMC often reports more positive relational behavior and has indicated the development of "online communities" and warm friendships. He observes that research has suggested that communicators develop individuating impressions of others through accumulated CMC messages and based upon these impressions, users may develop relationships and express multidimensional relational messages through verbal or textual cues.

Walther (1992) observes that social presence theory has been used to account for interpersonal effects in CMC research. CMC with its lack of nonverbal communication cues is said to be extremely low in social presence in comparison to face-to-face communication. However, he observes that it is not clear from the original theory of social presence (that electronic media differ in their capacity to transmit information about facial expression, direction of looking, and nonverbal cues), whether the actual characteristics of the media are the causal determinants of communication differences or whether users' perceptions of media alter their behavior.

A significant number of research studies that have explored the effects of CMC has failed to account for differences between CMC contexts and purposes. Walther (1992) observes that the degree of social presence, social context, or the relational qualities associated with CMC may be affected by the different social processes, settings, and purposes within CMC use as well. He cites research that reported that experienced computer users rated several text-based media including e-mail and computer conferencing, "as rich" or "richer" than telephone conversations, television, and face-to-face conversations. Case Studies of particular computer conferences have found the development of numerous personal relationships via CMC (Gunawardena, 1992). Walther (1992) notes that the relational qualities such as task or social orientation, and impersonality may be affected by other factors than the medium alone. If the nonverbal as well as verbal messages of face-to-face groups were coded, then the overall ratio of socioemotional expressions to total messages may be no different in face-to-face than in CMC groups. It appears that the conclusion that CMC is less socioemotional or personal than face-to-face communication is based on incomplete measurement of the latter form.

Even when CMC participants have no other sources of information about each other than their CMC interactions, some relational development may be expected to occur. Johansen, Vallee & Spangler 1988, (cited in Walther 1992) suggest that social presence can "be cultured" among teleconferencing participants, a position different from Short et al's (1976) position that social presence is largely an attribute of the communication medium. Research has indicated that CMC users develop an ability to express missing nonverbal cues in written form. One way of expressing emotion through this text-based medium is the use of "relational icons" or "emotions" the contrived sideways faces that can be made by combinations of punctuation marks. These marks contextualize the message within the relationship. Parenthetical metalinguistic cues such as "hmmm" or "yuk" in a message adds emotion to a text-based message. Such cues and emotions add affective information and indicate informality. Walther (1992) observes that studying CMC from a relational communication perspective offers an approach to the process that differs from a channel-effects view alone. A relational perspective suggests that functional and social factors should be examined.

2. Student Reactions to CMC and Audiographics

The preliminary studies conducted in Fall 1993 to assess students' personal reactions to CMC in two different contexts: the Globaled CMC conference, and the use of e-mail and Vax Notes as a supplement to the "Multicultural Issues" distance class taught primarily via audiographics, revealed interesting results. As indicated in Table 1, UNM students who participated in the Globaled conference rated CMC fairly high as an "interactive" and "active" medium. In the five point bi-polar scales that were used to assess student reactions, 1 was equal to a positive rating, for example: "interactive," and 5 to a negative rating, for example: "non-interactive. CMC also received fairly positive ratings as an interesting, sociable and stimulating medium. It is important to note that Globaled participants rated CMC as a sociable medium. Although this conference linked students in several universities who had never seen or met each other, the participants soon connected with each other as a result of initial introductions, and the social presence created by the participants helped to move the task oriented conference to a more social conference toward the middle of the semester. In Globaled, students were online frequently and exchanged social messages fairly often with each other. An interaction analysis currently being conducted on the Globaled conference indicates that the conference started as a very task oriented one, but moved to a more social conference toward the middle of the semester.

Table 1: Personal Reactions to CMC

Globaled	Mean	SD	Multicultural	Mean	SD
Interactive	1.69	.48	Interesting	2.00	.11
Active	1.92	.64	Stimulating	2.13	.09
Interesting	2.07	1.00	Easy	2.14	.18
Sociable	2.23	.60	Interactive	2.21	.19
Stimulating	2.31	.75	Active	2.37	.28
Appealing	2.46	.97	Efficient	2.43	.07
Reliable	2.46	.66	Appealing	2.54	.38
Easy	2.57	1.02	Reliable	2.67	.27

1 = positive rating, 5 = negative rating.

Students who used e-mail and Vax Notes as a supplement to a class on "Multicultural Issues in Adult Learning," met each other once face-to-face and interacted with each other via voice and graphics during weekly audiographics teleconferences. This group rated CMC as an interesting, stimulating and easy medium. However, their rating of the medium as an interactive medium is lower than the group that participated in the Globaled conference. The Multicultural group also did not rate CMC highly as a social medium. Part of the reason maybe that in the multicultural group, few students participated in the Vax Notes conference as many of the distance learners had problems of accessing e-mail and Vax Notes. Therefore, only a few students were online frequently. Although they had a separate conference space on Vax Notes called the "Coffee House" where they could interact socially, students did not use this space frequently. This group also had another medium to get to know each other. The Globaled participants, on the other hand, because they only had access to CMC to communicate with each other, got to know each other online by interjecting social messages. They worked harder to create a "social presence" and the feeling of an online community.

When comparing the CMC rankings of the Globaled group to the Multicultural group on the eight most highly ranked scales out of a total of 17 scales, it can be noted that the items ranked by both groups are similar except for one in each group. For the eight items listed in Table 1, the only difference for the Globaled group is that they ranked CMC as a social medium, while the only difference for the Multicultural group is that they ranked CMC as an efficient medium. All other scales not listed in Table 1, were ranked within a range of three which is the midpoint of the scale, indicating that students were either undecided, or neutral. There were no negative ratings for CMC. It can be concluded that even though CMC is a text-based medium, it can be perceived as interactive, active, interesting and stimulating. However, it is the kind of interactions that take place between the participants, and the sense of community that is created during the conference, that will impact participants' perceptions of CMC as a "social" medium. Therefore, the impetus falls upon the moderators of computer conferences to create a sense of online community and make space for social interaction to take place.

In the Multicultural class, students rated the audiographics system that was used as the main delivery medium for the course on the same 17 bi-polar scales. Audiographics was rated moderately high as "interesting" (mean=2.0, SD=.32), followed by "appealing" (mean=2.63, SD=.07), "interactive" (mean=2.63, SD=.11), stimulating (mean=2.68, SD=.32), and colorful (mean=2.85, SD=.22). Most of the other scales were rated around a range of three, indicating the midpoint of the scale. It is interesting to compare the Multicultural group's rating of the audiographics system and their rating of CMC. Both media were rated fairly high as interesting, stimulating and interactive. Audiographics received a fairly high rating as an appealing and colorful medium when compared to CMC, probably because of its ability to transmit digitized video and high resolution graphics. CMC on the other hand received a fairly high rating as an easy, active and efficient medium. The Multicultural class did not rate both media very high in social or humanizing characteristics. The Globaled group on the other hand, rated CMC fairly high as a social medium. Therefore, in spite of the characteristics of the medium, student perceptions of the social and human qualities of the medium will depend on the social presence created by the online community. For the Multicultural class, because the subject matter deals with exploring human emotions, the social presence created by both types of media may not have been adequate when compared to the kind of interaction that can take place in a face-to-face context.

The multicultural group gave two negative ratings to the audiographics system: unreliable (mean=4.63, SD=.68) and hindering (mean=4.50, SD=.65). The rating for unreliability was no surprise as the system generated several technical failures during the semester due to not having a permanent place at the distance location. The system was on wheels and had to be connected and disconnected for every class session and a substantial amount of class time was wasted on getting the system back online. This may have impacted students' perception of the medium as hindering. But it also may indicate that students were not comfortable with the technology and perceived it as a hindrance. The medium had not become transparent in the learning process. The lesson to be learned here is to make the learner as comfortable with the technology as possible so that the medium will become transparent in the learning process.

As stated earlier, this preliminary study examined students' subjective perceptions of the medium. In order for this kind of research to shed light on the issue of social presence, it is important to examine the relational messages and the context of the mediated exchange. These factors are currently being examined in ongoing research.

Conclusions

A common theme in the conclusions of social presence research studies examined in this paper, is that the instructor's verbal and nonverbal behaviors can directly impact affective and cognitive learning outcomes. These studies point toward social presence as a potentially significant factor in improving instructional effectiveness in both traditional and communications technology mediated distance classes.

However, in reviewing social presence research, it is important to examine whether the actual characteristics of the media are the causal determinants of communication differences or whether users' perceptions of media alter their behavior. It was noted that social presence can "be cultured" among teleconferencing participants, a position different from the view that social presence is largely an attribute of the communication medium. Research has indicated that CMC users in particular develop an ability to express missing nonverbal cues in written form. Therefore, studying a medium from a relational communication perspective offers an approach to the process that differs from a channel-effects view alone. A relational perspective suggests that functional and social factors should be examined.

Results from the preliminary study that examined students' subjective perceptions of two media suggest that in spite of the characteristics of the medium, student perceptions of the social and human qualities of the medium will depend on the social presence created by the instructors and online community. Within each telecommunications-mediated learning context, the learner is an equal distance from the learning stimuli, and it is only the learners' perceptions of interaction through various media that provide the sensation of social presence.

Instructors who are used to relying on nonverbal cues to provide feedback such as a smile, head nod, or hand gestures, and who have a lesser-developed ability to vocalize their feedback will be at a loss when teaching via channels such as audio teleconferencing and CMC that do not have the ability transmit certain nonverbal cues. These instructors need to learn to adapt to telecommunications media by developing interaction skills that create the sense of social presence. It is these skills and techniques, rather than the medium, that will ultimately impact students' perception of interaction and social presence.

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Investigating the Learning Process Online: An Evaluation Of Collaborative Interactivity in Audio and Computer Conferencing

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Overview

The College of Education at the University of New Mexico (UNM), through its Divisions of Learning and Teaching (Special Education), and Innovations in Education (Distance Education), is collaborating with the New Mexico State Departments of Adult Corrections, Education, and Children, Youth, and Families to address the timely issue of special education personnel development in New Mexico's juvenile and adult correctional facilities. The product of this collaboration is a pilot study comparing the effectiveness of audio and computer conferencing in the delivery of special education training to educators in correctional facilities. This study examines how two different interactive telecommunication strategies--synchronous audio-conferences and asynchronous computer conferences--manage the delivery of a field-based special education course employing collaborative and individual problem solving assignments. The course is being delivered into 18 correctional facilities in New Mexico, seven facilities receiving the course over audio conference, eleven over the computer.

The Problem

The prevalence of individuals with disabilities may be as high as three times greater in United States prisons than among our general population (Keilitz & Casey, 1988 and Snow & Briar, 1990). Currently, the correctional institutions in the United States serve a collective population of some 1.1 million men, women, and children. In addition to those incarcerated, nearly 3.5 million persons are under community supervision. Within the incarcerated population alone, more than 400,000 (40%) are believed to suffer from some handicapping condition (Coffey, 1983). In 1987, a review of the literature by the Institute on Mental Disability and the Law suggested that approximately 50% of youths in correctional settings have a disability that may qualify them for special education services (Power-Cluver & Yaryan, 1992). In 1991, Rutherford indicated that nationally, 40 to 60 percent of juveniles in correctional facilities had received special education when enrolled in public schools.

Research continues to confirm education as the most economical rehabilitation tool available for all individuals in correctional institutions (Brown, 1990; Fink, 1991). Men, women, and youth whose educational programs enable them to attain employment or seek further training are less likely to recidivate and are better equipped to advocate for themselves and contribute to the lives of their families (Lanier, Philliber, & Philliber, 1991).

The Individuals with Disabilities Education Act (IDEA), mandates individualized and appropriate education for all students with disabilities through age 21, even when they are imprisoned. Section 504 of the Vocational Rehabilitation Act of 1973 and the Americans with Disabilities Act of 1990 prohibits discrimination based on disability for individuals of all ages. However, most of the adult inmates needing special education are not served at all; juveniles, if they are served, receive only marginal or inadequate services (Rutherford, Nelson, & Wolford, 1985). Only five states claim partial compliance with the law in their correctional facilities (Eggleston, 1990).

One major stumbling block in implementing the Education for All Handicapped Children Act (P.L. 94-142) in correctional settings has been the difficulty in finding and hiring qualified special educators (Leone, 1986). Recent data indicate that there is less than one special education professional per correctional institution in this country. Unfortunately, special education teacher shortages are not confined to correctional facilities. There is a critical shortage of special education teachers in rural and remote regions all over the United States. In New Mexico for example, nearly 500 teachers hold emergency certificates or teaching waivers, thus comprising a significant proportion of service delivery in the field. These professionals must complete at least nine credit hours of course work per year to retain their positions, a difficult task in isolated areas far from colleges or universities. This shortage of specialists exacerbates the dilemma of finding and hiring special educators to work in correctional facilities. It seems more realistic to offer training to the professionals already working in the correctional facilities, many of whom have already expressed great interest in special education training.

Prison facilities in New Mexico are spread across wide geographical areas, frequently in isolated rural settings. Educators in these correctional settings have very few opportunities to share their classroom expertise or concerns with one another, have limited access to educational and/or resource centers and materials, and have needs unique to their settings. The difficulties recruiting and retaining educators in rural and isolated facilities and the need to continuously upgrade teachers skills require a radical change in the way teacher training is conducted. Teachers are generally asked to travel to university centers at night after a full day's work, participate in one or two day workshops, or relocate for one-week summer intensives. Once on campus, teachers typically lose their professional status and are, as students, inundated with ideas, materials, and suggestions for later application in their classrooms. Often what they learn is not applicable to their actual work settings.

Professionals would be better served if training and information were delivered directly into their workplace and generated participant input. Research has shown that when learners are respected and brought in on the design and evaluation of the training, their approach to the content and consequent assimilation of the material is enhanced (Henri, 1992).

Distance education technology is a viable means for the group design and delivery of teacher training and information transfer. In 1991, Knapczyk espoused collaborative learning supported by teleconferencing as an effective method of personnel development in rural and isolated settings.

The research conducted by Kirby & Boak (1987) and Hiltz, R. (1990), demonstrates audio and computer conferencing's ability to allow a collaborative process wherein the knowledge and experience of learners are incorporated in the design and training. However, the ability of audio and computer conferencing to allow for interaction and networking does not necessarily suggest that "learning" will be automatic. Carefully planned training and assignments are essential to enable interactive group structure and facilitate learning in a collaborative mode.

Hiltz (1988) describes the essence of collaborative learning as knowledge that emerges from active dialogue among those who are seeking to understand and apply concepts and techniques. Access to teleconferencing at the jobsite increases its learning potential. Answers acquired through conferencing, can be immediately applied in the work situation that houses the problem. Through the exchange of practical strategies and discourse with peers, instructors, and mentors, participants become actively involved in a dynamic and growing course content.

Course Description

A course entitled "Teaching the Special Needs Learner in Correctional Education," was designed by the author and Dr. Eggleston (a Correctional/Special Educator from California State University San Bernardino) specifically for correctional educators, using teleconferencing technology. The author and Dr. Eggleston are team-teaching the course electronically from New Mexico and California respectively. Electronic staff classrooms have been established in 18 of New Mexico's Correctional Facilities, including all the adult prisons (male and female), juvenile detention centers, county jails, public school detention homes, juvenile and adult diagnostic and development centers, a psychiatric treatment center, and the Department of Corrections' training academy.

The course is being offered for graduate or undergraduate credit (3 credit hours) and will last one semester. The objective of the course is to offer correctional educators an opportunity to: try out special education classroom strategies; develop a deeper awareness/understanding of the nature of disabilities; form a network of colleagues, mentors, and field experts; and interact with other agencies in order to more successfully impact the education/rehabilitation of their students. The course is scheduled to run for twelve weeks.

The first two weeks of the course are dedicated to learning the conferencing technology. Participants, both on the audio and computer systems, join mock conferences, set up their own conferences, and send messages electronically. The third week of the class is directed at the legal issues and laws concerning individuals with disabilities and the difficulties of implementing special education in the correctional facilities. The remaining nine weeks are divided equally into the following disability categories: mental illness, mental retardation, and learning disabilities.

The correctional educators in both the juvenile and adult facilities receive the course during the regular work day as part of their scheduled preparation period. The participants are also welcome to conference on their own time whenever convenient. Access to the instructors, colleagues, technical support, and experts in the field occurs entirely over audio or computer conference. Participants will have continuous access via conference to the course instructors, their colleagues, mentor teachers, and field experts from around the state of New Mexico.

Collaboration occurs in small groups within the facilities and among colleagues at distant sites (e.g., educators at the women's prison collaborating with colleagues at the girl's juvenile center) via conferencing technology. Participants conference with mentor teachers and field experts, independent of their instructors, in order to solve problems and complete assignments (e.g., educators at the jail and educators at the psychiatric treatment center conferencing with a field expert on Fetal Alcohol Syndrome). Students have continuous access to a technical support team (an information analyst/librarian from Hamilton, New York, two student assistants from the departments of Criminology and Training and Learning Technologies at UNM, and a high school student with computer expertise from Albuquerque High School). Mentor teachers and field experts have been solicited from the fields of Special Education, Vocational Rehabilitation, Mental Health, Criminal Justice, Correctional Education, Public Health, and Developmental Disabilities.

Prior to the start of the course, the author/instructor traveled to each of the sites in order to install and test the conferencing equipment, administer a pretest of special education competencies, train the participants on how to use the conferencing equipment, demonstrate how to problem solve collaboratively, and solicit from the participants a hierarchy of their training neEDS.. Six months prior to the course delivery, the University of New Mexico hosted a two-day training for the correctional educators. On the first day the educators met the two instructors face-to-face and learned about the format/content of the course. On the second day they were given email accounts and an introduction to the Internet.

A survey conducted at this time generated the following areas of concern: traumatic brain injury, attention deficit disorder, conduct disorder, fetal alcohol syndrome, substance abuse, mental illness, mental retardation, communication disorders, learning problems, and infectious diseases.

All participating sites received a printed text, "Special Education in the Criminal Justice System," and a study guide containing course assignments. The study guide, in a three-ring binder, contains a week-by-week description of the course development. This study guide is purposely designed as a "shell" providing the core of the curriculum while remaining open for expansion, allowing the participants to direct their training as the conferences progress.

The guide is written in conversational style and contains the syllabus, participant introductions (including the technical support team and field experts), photos of all participants, readings, assignments, and the audio or computer conferencing manual. The author, with the assistance of the technical support team, created audio and computer conferencing manuals describing how participants and instructors can use the technology to access the course content and maximize its potential.

Audio Conferences: Synchronous Delivery

Seven sites are receiving the course over audio conference and are equipped with speaker phones, facsimile, and answering machines. All audio conference bridges are supported by Preferred Communications , selected for its myriad services: ongoing training and support, pre-notification, taping of conferences (allowing for transcript analysis), continuous monitoring, and subconferencing (allowing participants to break into teams or small groups with an operator standing by). Participants are asked to fax to their colleagues a brief biography. The course focuses on three disability areas: mental retardation, mental illness, and learning disabilities. Three weeks are dedicated to each of these areas. On Monday of each week, at a designated time throughout the duration of the course, a formal one-hour conference between the instructors and the participants is conducted. The instructors conference for one hour with 4 sites, disconnect, then establish a conference with the remaining 3 sites. These conferences center around a set topic but may take many different forms (lecture, reactor panel, guest speaker, participant presentation etc.). During the first week, participants discuss the disability topic for approximately 20 minutes (discussion based on readings or previous experience), go offline for 15 minutes to perform an associated activity, come back on to discuss the activity, and return online to generate areas of concern, case histories, and prior problems or strategies associated with that disability area.

Each participant leaves the conference with an individual assignment (e.g., strategies to try out in their classrooms) and an assignment involving team problem-solving across distant sites, designed to generate better understanding of the disability being studied. Field experts/mentor teachers are assigned or suggested to assist this team problem-solving assignment.

Participants are instructed to try out the classroom strategies with their students and send a short reaction on the success or failure of the suggested classroom strategies via facsimile to their instructors. They also prepare to discuss the results of the individual assignment on Monday of the second week. Participants are instructed to collaborate with their teammates (onsite and distance) and field experts initiating their own independent audio conferences. Solutions to the problem and information on the disability gleaned during the independent conference calls, is edited and distributed by the team and sent via facsimile to all participants. Teams will lead the formal one-hour Monday conference call on the third week, sharing with the entire group the information they have discovered.

Computer Conferences: Asynchronous Delivery

Eleven sites are receiving the course via computer conference and are equipped with PC's containing word processing, communications and conferencing software. The conferencing software, Vax Notes, was chosen for its ease of use by computer novices and its ability to allow group problem solving.

The following conferences have been created inside the conferencing software: Syllabus, Cafe', Introductions, Technical Help, Weekly Topic, Individual Assignments, and Team Assignments. On Monday , Week One, the instructor types into the Weekly Topics conference details of the disability under discussion. Participants are directed to open this conference, carry out associated activities, and generate areas of concern, case histories, and prior problems or strategies associated with that disability area. There are no time constraints in asynchronous computer conferencing. Participants have continuous access to the Weekly Topic conference and leave the conference with an individual assignment (e.g., strategies to try out in their classrooms) and an assignment involving teams group problem-solving across distant sites to generate better understanding of the particular disability being studied. Field experts/mentor teachers will be assigned or suggested to assist with this assignment.

Assignments on the computer conference are identical to the audio conference; however, computer participants are instructed to collaborate with their team mates and field experts inside Vax Notes in conferences labeled Team Assignment, and/or create and moderate their own conferences.

Solutions to the problem and information on the disability gleaned during the conferences are edited and distributed by the team or group and sent via email to all participants (post delivery is acceptable). Similar to the audio conference, computer conferencing teams lead the conference labeled, Weekly Topic on Monday of the third week, sharing with the entire group the information they have discovered.

Research

Pre and post tests, pre and post-course questionnaires, group interviews, a learning styles inventory, and transcript analysis are being used to determine the effectiveness of the audio and computer conferences in delivering special education inservice training into the correctional facilities. The pre-course questionnaire is designed to generate participant inservice priorities and preference for delivery over a synchronous or an asynchronous mode. The pre and post tests are designed to determine the correctional educators' special education knowledge, attitudes toward inmates with disabilities, opinion of themselves as professionals, association with professional organizations, and perception of whether telecommunications systems can retain an effective human dimension in education delivered at a distance.

In addition to mastery of concepts, as demonstrated on a course grade, the pre and post tests will ascertain whether participants have an increased knowledge base, are able to apply the material of the course in new contexts, express their own independent ideas, and synthesize the information. Participants' attitudes concerning collaborative learning assignments and the outcomes of the assignments will be matched to participants' learning styles. The transcripts of both the audio and computer conferences will be carefully analyzed, focusing on the learning process as revealed in the conference messages. Five dimensions of the learning processes will be highlighted: participation, interaction, socialization, cognition, and metacognition. The conferencing transcripts will be analyzed using software designed by Dr. Henri at the TeleUniversite in Montreal, Canada. Group interviews conducted at each site will be used in order to solicit open, spontaneous, participant-led discussion.

Final Thoughts

In 1973, Wedemeyer stated that people should not be denied the opportunity to learn because they are poor, geographically isolated, in poor health, socially disadvantaged, institutionalized, or otherwise unable to place themselves within the institution's setting. Before correctional educators can offer educational access to incarcerated students with disabilities, they themselves need information and training.

Audio and computer conferencing can offer critically needed inservice training to all isolated educators while affording them an opportunity to interact locally and nationally with instructors, colleagues, databases, library resources, and educational centers. The technology we choose for distance education and workplace training will serve our educational needs only when we understand how to utilize it to maximum capacity. We need to understand our audience and the abilities of our instructors, and to work together to consider the critical elements of the learning process as we design future teacher training.

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Dual-Mode Postsecondary Distance Education Support Services: The Student's Perspective

SHERRI M. KNUTSON

The purpose of this study was to examine and define how satisfied distance learning students of a dual-mode postsecondary educational institution were with the current level of student support services, and what they perceived to be the critical elements of and desired access for an effective support services program.

Methodology

A survey was administered to the entire population of distance education students (599) enrolled in 18 interactive video courses provided by three public dual-mode universities to six sites in a midwestern state.

Results

Of the 599 students enrolled in the 21 courses offered by three of the state's public universities, 76% responded (see Table I). More than half of those responding, 53%, were on-campus students and 44% were students attending at remote sites (referred to hereafter as remote students).

Students reported themselves as being generally satisfied, if not neutral, with the current support services as made available by the university providing them the interactive video course (see Table II). More significant differences between satisfaction means were found when analyzed by site.

Library resources and academic advising top the list of those services students felt are important to be made available by the university providing them the interactive video course (Table III). These generally held true when examined by site as well. Overwhelmingly, face-to-face was the most desired means of access to support services for the responding students (Table IV). This also was the same across providing universities and sites.

Table I
Frequencies (Freq.) and Percentages of Enrolled and Responding Students

Location	Total Enrolled	Total Responding	On-Campus	Remote
University 1				
Freq.	283	221	123	98
%		78%	56%	44%
University 2				
Freq.	254	164	84	80
%		65%	51%	49%
University 3				
Freq.	62	60	34	26
%		97%	57%	43%
Site A				
Freq.			123	--
%*			51%	--
%+			100%	--
Site B				
Freq.			84	7
%			35%	3%
%			92%	8%
Site C				
Freq.			34	22
%			14%	11%
%			61%	39%
Site D				
Freq.			--	79
%			--	40%
%			--	100%
Site E				
Freq.			--	50
%			--	25%
%			--	100%
Site F				
Freq.			--	41
%			--	21%
%			--	100%
Total				
Freq.	599	455**	241	199
%		76%	53%	44%

* Percent of all on-campus/remote students
+ Percent of students at site
** Includes 11 students not providing university information

Table II
Means and Standard Deviations of Student Satisfaction with support Services (All Respondents)

Support Service

	CR#	FA	BkSt	Lib	Tutor	AcAd	CP&P	PC
Overall								
M	3.67	3.25	3.54	3.63	3.16	3.25	2.95	3.08
SD	1.00	1.18	1.08	1.03	0.89	1.03	1.06	1.07
F+	334	215	288	291	114	248	177	138
%	73	47	63	64	25	55	39	30

Overall Mean: 3.32

+ F=Frequency
# - CR=Course Registration; FA=Financial Aid Services; BkSt=Bookstore; Lib=Library Resources; Tutor=Tutor Services; AcAd=Academic Advising; CP&P=Career Planning & Placement Services; PC=Personal Counseling

The results of the survey signified there was a surprising percentage of students indicating that some support services were not available to them from the university providing their course (see Table V). This contradicted the reports as provided by the universities. Remote students were more apt than on-campus students to report they did not use the services available to them from the university providing their course.

Discussion

From the results of the satisfaction scales, it can be concluded that distance education students are generally satisfied, if not ambivalent, with the support services typically available to them from a university providing their interactive video course. On-campus students are more satisfied than remote students with half of the support services, and vice-versa is true with remote students for the other support services.

Existing literature provides insight as to reasons for the ambivalence. Bartels (1982) states that adult students attribute problems to their own incompetency rather than any shortcomings in the university (p. 13). As other literature indicates, adult learners are more autonomous, depending more upon themselves than on outside

Table III

Frequencies (F) and Percentages of Important Support Services by Providing University

	Providing University			
Service	Univ. 1	Univ. 2	Univ. 3	Total
No. Responding Students				
F	64	61	27	152
%@	29	37	45	33
Library Resources				
F	16	18	27	152
%#	25	30	11	24
Academic Advising				
F	16	11	8	35
%	25	11	30	23
Tutor Services				
F	5	8	8	21
%	8	13	30	14
Career Planning & Placement				
F	10	7	4	21
%	16	11	15	14
Bookstore				
F	7	7	6	20
%	11	11	22	13
Course Registration				
F	8	8	1	17
%	13	13	4	11
Personal Counseling				
F	2	3	1	6
%	3	5	4	4
Copies of Course Materials				
F	2	2	1	5
%	3	3	4	3
Financial Aid				
F	8	7	0	15
%	13	11	0	10
Instructor Contact				
F	2	11	0	13
%	3	18	0	9
Videotapes				
F	0	4	4	8
%	0	7	15	5
Other				
F	9	5	2	13
%	14	8	7	13

@ Percent of total responding students for providing university

# Percent of students responding to question

Table IV

Frequencies (F) and Percentages of Overall Student Desired Access to Support Services

	Support Service*													
Access	N	AA	T	CM	CPP	BS	PC	L	FA	CR	VT	IC	O	NSL
Overall (N=126 / 28% of total survey respondents)														
Face-to-Face														
F	80	27	14	0	14	9	5	18	11	9	3	3	4	13
%#	63	34	18	0	18	11	6	23	14	11	4	4	5	16
Phone														
F	47	11	5	0	5	4	0	8	0	6	0	11	0	11
%	37	23	11	0	11	9	0	17	0	13	0	23	0	23
Mail														
F		32	6	4	0	6	5	0	11	3	5	2	0	37
%	25	19	13	0	19	16	0	34	9	16	6	0	9	22
Computer/Modem														
F	19	3	0	3	0	0	0	5	0	3	0	0	0	2
%	15	16	0	16	0	0	0	26	0	16	0	0	0	11
Facsimile Machine														
F	18	0	0	1	0	0	0	5	0	5	0	4	0	3
%	14	0	0	6	0	0	0	28	0	28	0	22	0	17

* N=Number of students responding; L=Library; AA=Academic Advising; T=Tutor; CPP=Career Planning & Placement; BS=Bookstore; CR=Course Registration; PC=Personal Counseling; CCM=Course Materials; FA=Financial Aid; IC=Instructor Contact; VT=Videotapes of class; O=Other; NSL=No Service Listed

# Percent of students responding to question

TableV

Frequencies (F) and Percentages of Not Available Scale Response (All Respondents)

		Support Service							
		CR#	FA	BkSt	Lib	Tutor	AcAd	CP&P	PC
Overall									
	F	30	30	42	39	49	32	32	33
	%	7	7	9	9	11	7	7	7

# = CR=Course Registration; FA=Financial Aid Services; BkSt=Bookstore; Lib=Library Resources; Tutor=Tutor Services; AcAd=Academic Advising; CP&P=Career Planning & Placement Services; PC=Personal Counseling

Resources

Nayman and Patten (1980) indicate that adult learners "are generally reluctant to ask for help and may actually underutilize services" (p. 47).

For several support services, a high percentage of students indicate they do not use them. These results indicate a general low awareness by the students about the support services available. That the services provided by universities to their distance education students need to be highly visible is supported by Thompson (1989). This is also stressed by Cross (cited in Paul, 1988, p. 51) when she states that even when a wide range of services are available, students may not avail themselves of them as they are not aware of their existence.

Given that support services play an important role in the improvement of the student's learning experience and retention, universities should take proactive steps to ensure that their distance education students are aware of what services are available, how to access them, and what is the purpose of each service. Only then can students make informed choices about how the services fill their needs.

Sewart (cited in Keegan, 1986, p. 106) asserts that quality support services are crucial to the university's ability to retain students. Medsker, et al. (cited in Feasley, 1982, p. 21) state the "support services are almost as important to extended degree programs as the curriculum and the delivery systems used."

It is important for the dual-mode university not only to provide support services, but to ensure that those considered most important by the distance education student form the core of the support services program. From the results of this study it can be concluded that library resources and academic advising are the most important support services that distance education students want to be made available by the dual-mode university providing their interactive video course. An implication of this part of the study is that these services should form the core of any support service program for distance education students.

Without an adequate support services program, the dual-mode university will lose students unnecessarily through attrition. Also, if a dual-mode university does not know what services are most needed by its distance education students, it is liable to spend unnecessary effort and money providing services that are not considered essential.

The issue of access to support services is as important to the success of the dual-mode university's support services program as what services are included. Not surprisingly, the students of this study desire face-to-face contact with support services. This indicates that, for those services which the distance education student deems the most important, face-to-face contact is the access means of choice. The literature supports this concept as face-to-face communication is considered the most complete form of communication. In other forms of communication than face-to-face, the elements of non-verbal communication is lost.

Face-to-face communication allows for a greater sense of immediacy (Wiener & Mehrabian, cited in Short, Williams, & Christie, 1976, p. 72). Westrum (cited in Short et al., 1976, p. 75) also indicated face-to-face as being necessary in situations that involve a high degree of emotional contact.

However, the universities in the present study indicate that all services are available face-to-face to the distance education student--but on their campuses. In other words, the services are available to the remote student the same way they are to on-campus students.

What this implies for dual-mode universities is that, for support service programs to be effective, essential services (academic advising and library resources) should be provided through means which are specifically designed for the distance education student and sensitive to their needs.

The number of students indicating that services are not available, while their providing university indicate the opposite, is surprising. At any level, this is a significant fact of which dual-mode universities should take notice.

One reason for the percentages of students that report unavailability of services when the university indicates they are available, is the student may be indicating it is not available to them. For instance, universities indicate that library services are available to distance education students via the statewide library computer network. But, to gain access, the student must first have access to a computer and modem. This is not always possible.

This may also hold true for other services. The student may know that academic advising is available to them by phone and mail. But, if that student desires face-to-face contact, and that is only available on the university's campus (which may be several hundred miles away), for all practical purposes, the student feels the service is unavailable. This would imply that dual-mode universities need to ensure that the ways by which students are informed of support services are adequate and provided to each student.

Summary of Research Questions and Post Hoc Analysis

In conclusion, it is now known what support services are important to the distance education student in a dual-mode university setting, and that academic advising and library resources top the list. It is also known that face-to-face is the most desired means of access for these services.

Important to the success of the dual-mode university's support service program is the way by which the distance education student is informed of its availability. These methods need to ensure that all students, both on-campus and remote, have equal access to the information.

Knowing that budgets are generally tight for universities, there are several priority considerations that can be established. First, it is necessary for dual-mode universities to ensure that academic advising and library resources are a part of their support service program for distance education students. If they are not, and other services are, the inclusion of the essential services at the exclusion of other services may be necessary.

Second is the issue of access. Face-to-face access is expensive. It means, in the case of academic advising, sending the faculty members or other staff to the various sites at which students attend the interactive video course. However, dual-mode universities that do not provide face-to-face access to academic advising risk losing distance education students, which, while as students and, later, as alumni, are the foundation of a university's revenue.

With the concepts of service type and access in mind, it may be helpful to provide the distance education students a place within the community such as a local learning center, if not at the site at which they attend the course, where they can, and are encouraged to get together outside of class.

In regard to access to library resources, although face-to-face is the most desired means of access, an improved computer/modem system could be sufficient. To provide this, dual-mode universities should make available one or several computers and modems at the site where the distance education students attend courses or at a local learning center.

In addition, how the distance education student is informed of support services is a matter of tightening up current information processes. A brochure detailing what support services are available, the purposes that they serve, and the means by which they can be accessed, should be provided to every student registered for interactive video courses, regardless of how they register.

Another possibility is a central resource, or toll-free hotline, which the distance education student could contact by phone for answers to various institutional questions and referrals to other sources. This central resource could be sponsored jointly by those universities providing distance education courses.

Regardless of the type of service and the way it is made available by dual-mode universities, it must be staffed by knowledgeable individuals who are sensitive to the needs of the distance education student. To do this, dual-mode universities should provide training for support service staff, in addition to faculty of distance education courses, as to the characteristics of the adult learner and, more specifically, the distance education student.

Overall, it is clear that there are priorities that should be set by dual-mode universities in the development of a support service program for distance education students. These priorities relate to the services to be provided, the means by which the services can be accessed, and the ways by which the distance education student is informed of the support service program. If the dual-mode university takes care in ensuring these priorities are set properly, it also takes steps in controlling what factors it can in student retention, thereby avoiding the "avoidable drop-out."

Most importantly, dual-mode universities must remember that distance education developed out of their desire to provide education to students who did not otherwise have access. It is important not to lose focus of that ideal. But, the dual-mode university must also be aware of what the distance education student stands to lose if the educational experience is not a satisfactory one. For dual-mode universities to provide courses without adequate support services for the distance education student is negligent. Not only does this subvert the universities' mission of quality education but exposes the student to unnecessary failure.

So, if the providers of distance education in the dual-mode setting are sincerely concerned with the educational experience and success of their distance education students, they will provide a support services program, of which the core includes academic advising and library resources, and is made available by practical means, preferably face-to-face.

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A Study Of On-Campus And Off-Campus Graduate Nursing Students

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Introduction

As nursing education moves into the information technology age and education programs expand into rural and frontier areas, information is needed concerning distance learners. Distance learning at the University of North Dakota is accomplished primarily through the Interactive Television Network (ND IVN). This delivery modality involves an instructor teaching in an "interactive classroom" on any of the eleven campuses of the North Dakota University System with students at as many as eleven other sites (some at distances of over 350 miles away). The students can hear, see and participate with the instructor and each other by the use of this state-wide fiber optic telecommunication network. The College of Nursing at the University of North Dakota is the only state assisted nursing education program authorized to offer the master's degree and as such has a statewide mission at the graduate level. Clinical specialization tracks are offered in adult health, anesthesia, rural health, parent-child nursing and family nurse practitioner. These master's programs are offered either totally or partially on the Interactive Television Network and include students from all areas of North Dakota, eastern Montana, northwestern Minnesota, northern South Dakota, southern Saskatchewan and Manitoba.

The challenge for nursing faculty is to understand the advantages and disadvantages of this system of learning and assist each student in reaching their potential goal with a minimum of frustration and conflict. The purpose of this study was to assess, compare, and make inferences regarding graduate nursing students and their challenges and barriers to distance learning.

Methodology

The population consisted of all the graduate nursing students either enrolled in graduate school, those taking courses but not yet accepted into graduate school or the students that took a course but did not continue with the program. A five part questionnaire with a letter of instruction and a return addressed envelope was sent to 151 graduate nursing students. In response to a second mailing, 102 students returned completed questionnaires resulting in a response rate of 67.55 percent. Of this total, twenty-nine (19.21%) graduate nursing students did not participate in the interactive television network system for learning and the data was used for comparison studies. One questionnaire was too late to be included in the analysis.

Instrument

The instrument in this study was a five section questionnaire consisting of a demographic geographic profile, education and work profile, graduate education information and technology for distance education profile. There were four and five point Likert scales used to study community and practice satisfaction as well as technology for distance education. Also , there were three open ended questions concerning difficulties during graduate nursing school and barriers or difficulties to the technology for distance education.

Data Analysis

The data was analyzed using descriptive statistics for the characteristics and t-Tests to determine differences in patterns between the students having courses or not having courses over the Interactive Television Network.

Findings

Sample Characteristics

The average North Dakota graduate nursing student was 50.4 years of age, married (78%), white (96%), female (92%), with 1.465 children at home and other relatives (0.257) living with them. The majority of the respondents presently live in towns of 10,000 to 50,000 population (43.6%), or greater than 50,000 population (25.7%) with only 29.7% living in towns less than 10,000 population. The three most important factors the respondents stated as reasons in choosing to live in their present location was: 1) Job location (52.5%), either the respondents job (29.7%) or spouses job (22.8%); 2) Home and originally were from this area (16.8%); 3) Quality of life, social, recreational, environmental (17.8%). The majority of the respondents were satisfied (92.1%) with the community in which they lived and few were interested in moving from their location after obtaining their master's degree. The largest moving increase (7.0%) was into populations greater than 50,000 (25.7% to 32.7%) with the largest loss (6.0%) in populations of 10,000 to 50,000 (43.6% to 37.6%). The majority of the respondents were born (45.5%) and grew up (49.5%) in areas less than 2500 population as did their spouse (33.7% and 41.6% respectively).

Education and Work

The mean year the respondents obtained their RN licensure was around 1978 with the first nursing program listed as an Nurse Aid (37.6%), followed by diploma nursing (24.8%), BS (19.8%), associate degree (13.9%) and the lowest was LPN (4.0%). The majority of the respondents are currently working (94.1%) as registered nurses (93.1%) in full-time positions (56.4%). The part-time nurses (34.7%) work an average of 6.98 hours per week. The majority of both full-time and part-time nurses are employed at public hospitals (39.6%) in the nursing specialty of administration/supervision (16.8%) and Intensive Care Nursing (16.8%) followed closely by teaching (15.8%).
Other employing agencies (12.9%) that the respondents were employed either full or part-time were: Tribal health facilities (n=2), Home care services (n=2), camp nursing, district health unit, cooperative of rural hospitals, community action programs, county public health, county agriculture programs, and federal government programs. Other nursing specialties (10%) that the respondents were employed either full or part-time were: Public health (n=5), emergency room (n=5), cardiac care (n=2), maternal child (n=2), general medicine (n=2), pediatric ICU, NICU, geriatrics, outpost nursing, enterostomal care, renal dialysis, home health, family nurse practitioner, and research.

The respondents were satisfied to well satisfied with their relationship with peers (97.0%), challenging aspects of the job (87.1%), independence in work (85.2%), opportunity to improve skills (84.1%), social position accompanying the job (82.2%), spirit of cooperation among co-workers (81.2%), opportunity to pursue higher education (81.1%), working conditions (79.2%), opportunity for continuing education (78.2%), the way my home situation fits my work (77.2%), personal policies (76.2%), perception of nursing as life work (76.3%). Some of the lower satisfaction levels were found in satisfaction with my present position (75.3%), respect for individual opinions (75.2%), made to feel like a team member (74.3%), opportunity to try new ideas (72.3%), relationship with administration (71.3%), job security (70.3%), recognition of good performance (69.3%), work load (69.3%), competence of supervisors (66.4%), salary and benefits (60.4%), the stress under which I work (58.4%), and advancement opportunities (50.5%).

Graduate Education

The majority of the respondents had formally entered graduate school (88.1%) with only 14.9% taking courses before entering graduate school. The three most important factors the respondents listed in choosing to attend graduate school were: 1) personal growth and satisfaction (33.6%), 2) career advancement and professional attainment (20.8%), and 3) job security (9.9%).

The three barriers that made graduate school too difficult to continue for some respondents (8.9%) were all listed as financial (5.9%, 6.9%, and 4.0%) although the majority of respondents (77.2%) felt the barriers were not difficult enough to quit graduate school.

The respondents agreed that obtaining a master's degree in nursing would help: fulfill future plans and goals (93%), influence changes in health care (88%), make nursing more challenging (88%), provide better client care (84.2%), provide opportunity for advancement (82.2%) obtain the job in nursing they wanted (80.2%), increase respect in the community (77.2%), obtain a better salary and benefits (64.3%) and increase job security (57.5%).

The respondents found graduate school being very easy to very difficult and responded from easy to difficulty from highest to lowest as follows: receive encouragement from other classmates (85.1%), receive encouragement from family (81.2%), respected and valued as a classmate (80.2%), receive assistance from the faculty (77.2%), receive encouragement from the faculty (75.2%), and able to contact faculty when needed (71.3%) were the highest factors .The factors becoming more difficult included: have classes on interactive television (66.4%), learning the clinical skills (64%), utilizing the library resources (63.4%), obtaining emotional support to continue (59.4%), using a computer (58.5%), feeling part of a community of scholars (54.4%), learning the academic material (53.5%), writing papers (50.5%), getting time off from work to attend graduate school (48.6%), getting finances to attend and continue graduate school (44%), driving distance to classes (36.7%) and writing a thesis or research study (24.8%).

The driving distance to classes averaged 77.188 miles per week per graduate student with a range between 1 mile to 500 miles per week.

The majority of the graduate nursing students responded that their level of academic achievement had been met (63.4%) with 11.9 % having exceeded expectations and commenting that graduate school was a positive experience. Some were "amazed they could do the work since they had been out of school so long", "were enjoying the process", "blossomed academically in ways not expected", "faculty were very helpful", "an achievable challenge", "allowed me to pursue some of my interests", "very much enjoyed graduate school and the support given by the staff and peers" and "provided me skills, confidence, and open- minded way to view obstacles as opportunities".

Some of the graduate nursing students (18.8%) responded that they did not meet their expectations at all. They were dissatisfied and responded that "graduate school is a political process", "learning expectations were met but not grades", that they "received a "B" for "A" work", that it is difficult to "balance family, home, work, community involvement, driving and school", and feeling lonely and frustrated as "don't know anyone in class".

After graduation, with a master's degree in nursing, the respondents will remain in the same town (47.5%), remain at the same job (43.6%), change area of work (28.7%), change jobs (23.8%), get a better nursing job (23.8%), practice in a large hospital (20.8%), practice in rural community health (17.8%), practice in a nursing school (16.8%), practice in a rural clinic (12.9%), practice in a small hospital (12.9%), practice in a small farm area (12.9%), practice in a metropolitan area (11.9%), move out of state

(9.9%), practice in a rural poverty area (7.9%), practice on an Indian reservation (7.9%) and a few in other areas of work.

Satisfaction with Distance Education

Of the respondents (n=72) who had classes on ITN, the majority (87.5%) were very satisfied with Interactive Television as well as rating distance education as being very effective (95.8%). There were positive statements concerning distance education by the Interactive Television Network such as: "I feel privileged to be able to obtain a master's degree from UND over ITV", "No problems with ITV and distance education", "Interactive Television has been a great barrier buster - great job", and " Interactive Television is a great way to get students through the program".

In rating other aspects of distance education they were very satisfied with: teacher's comfort with the Interactive Television Network (87.5%), visual aids such as overheads (86.1%), textbook availability (86.1%), teacher's preparation (84.7%), system audio and screen quality (83.3%), teacher's interactive skills (81.9%), individual discussion (81.9%), technical support (81.9%), sufficient class interaction (80.6%), group activities (75%), access to teacher outside class time (70.8%), getting materials on time (70.8%).

The lowest levels of satisfaction were with library availability (66.7%), able to react to the non-verbal feedback in the classroom (58.3%), video taped classes (30.56%), and NEN satisfaction (16.7%).

There were 28.7% (n=29) respondents that did not have class over the Interactive Television Network therefore did not answer the questions concerning distance education.

Barriers to Distance Education

An open-ended question asking about what the students found as barriers to learning resulted in an overwhelming amount of responses. The results were categorized and rated from highest to lowest were as follows:

(1) Interactive Television Network courses (n=45) - Time of classes (same day (n=8), evening (n=4), earlier in the day (n=2), issues and core in the summer (n=2); decrease workload and paperwork (n=10); better coordination and organization of classes (n=3); more flexibility of classes (n=3); condense courses that are repetitive (n=2); difficult to interact with each other when we meet only occasionally (n=1); increase ability to see teacher and overhead at the same time (n=1); grades on a standard scale (n=1); use breaks more frequently in class (n=1); send material to all students at the same time (n=1); better orientation (n=1); no full time semesters (n=5) and bigger TV screen (n=1).

(2) Interactive Television Programs (n=27) - more ITV programs such as electives, specialties (n=15), expand the Network (n=12) into northern Minnesota, Indian reservations, Fargo, and "nursing education should start to be more adventuresome and expand borders in a cooperative venture with other states and state systems".

(3) Time of Interactive Television courses (n=16) - same day classes (n=8), more evening classes (n=4), classes earlier during the day (n=2), issues and core classes in the summer (n=2).

(4) Financial programs (n=11) - more financial programs available including GTA positions and scholarships (n=11).

(5) Interactive Television Faculty (n=8) - more site visits by faculty (n=2), faculty available during the day to take our calls (n=2), a mentor (n=1), more helpful faculty (n=1), someone to answer our phone calls (n=1), list of faculty available to be advisors (n=1).

(6) Communication between all areas (n=5) - "improve interaction between the distant student, nursing dept, graduate school, business office, financial aid, bookstore, registrar, registration". "One gets a different answer from each area and it is very frustrating". "Generally the staff involved in registering and paying

are rude and inflexible", " Have someone in nursing take care of the minor details" (n=5).

(7) Library services (n=4) - the "library should do our literature searches as is done in some libraries", also "should have a UND Id card for access to the library" (n=4).

Conclusions

This study found that the majority of the respondents were very positive concerning distance education and the "privilege" of obtaining a master's degree via the interactive television network. They wanted more programs and an expansion of the Interactive Television Network. However, they did have some concerns that would improve the learning experiences. Most of the colleges within the University of North Dakota that use the Interactive Television Network spend a great deal of time trying to improve the learning experiences for the students but that does not include the other support systems of the University. Therefore, the suggestion for improvement of communication between all aspects of the system that involves students is an area for resolution of difficulties. The difficulties concerning the courses can be resolved by the individual faculty member but the times of classes remains a problem since the students do not agree on one time and the system, which has an overload of classes, decides on the time available for each class. Some classes have priority over others for the semester.

There seems to be a repetition of low satisfaction with the library availability which has been explored frequently. Programs for the computer such as Grateful Med and others are being used and students who have computer skills or own their own computer seem to do well. Most of the distant learners, who are older students, have not had the chance to become computer literate therefore depend soley on the main library on campus for references and this can take time, energy and many phone calls.

The suggestion for more site visits by faculty would be very difficult as most faculty have a full teaching load of both undergraduate and graduate courses. To visit sites in North Dakota means a drive to the west of close to 400 miles and then, because of the distance one can only visit a site a day. We do try to visit each site once a semester and coordinate teaching with visiting students and evaluations of clinical presentations. The faculty are very aware of the necessity to form a community relationship with distant learners and promote peer relationships which is many times accomplished by telephone as well as the interactive television network. Hours are spent on the phone coordinating and talking about concerns with the distance learner.

Distance driving is a necessity in North Dakota and the Interactive Television Network has been a "great way" to bring higher education to all areas of the state but it still requires a great deal of driving, especially for students in small farm areas or out of state. This is one reason the students would like classes on the same day with the other reason being work and the difficulties of classes breaking into a work schedule.

But despite all the constraints of distance education, Fulmer et al (1992), Ardnt (1990), Parkinson & Parkinson (1989), Boyd & Baker (1987) and Paulet (1987), found that students find it a definite advantage to have classes close to or in their home communities. This was true also of the respondents in this study. They wanted more courses on the Television Network and expansion of the network into their home communities even if they were in another state or another country. The Interactive Television Network is definitely a "barrier buster" which creates friendships and relationships between cultures and countries.

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Table 1. Characteristics of Graduate Nursing Students

Characteristics		N	Percent	Mean
Ethnicity	White	97	96.0	
	Indian	03	3.0	
	Hispanic	01	1.0	
Marital Status	Single	11	10.9	
	Married	78	77.2	
	Divorced	11	10.9	
Gender	Female	93	92.1	
	Male	08	7.9	
Birth Year	1936 - 1939	04	4.0	43.62
	1940 - 1949	16	16.0	
	1950 - 1959	32	31.9	
	1960 - 1969	27	26.9	
	Missing	22	21.8	
Family at Home	Children			1.465
	Relatives			.168
	Other			.089
Community Size	Town you grew up in			
	<2500	50	49.5	
	2500 - 5000	14	13.9	
	5000 - 10000	05	5.0	
	10000 - 50000	16	15.8	
	>50000	16	15.8	
	Town spouse grew up in			
	<2500	42	41.6	
	2500 - 5000	06	5.9	
	5000 - 10000	07	6.9	
	10000 - 50000	16	15.8	
	>50000	14	13.9	
	Missing	16	15.8	
	Present town size			
	>2500	20	19.8	
	2500 - 5000	03	3.0	
	5000 - 10000	07	6.9	
	10000 - 50000	44	43.6	
	>50000	26	25.7	
	Missing	01	1.0	
	Town size you want to work in after graduation			
	>2500	14	13.9	
	2500 - 5000	05	5.0	
	5000 - 10000	09	8.9	
	10000 - 50000	38	37.8	
	>50000	33	32.7	
	Missing	02	2.0	
Community Satisfaction				
	Very Satisfied	61	60.4	
	Satisfied	32	31.7	
	Dissatisfied	05	5.0	
	Very dissatisfied	02	2.0	
	Missing	01	1.0	

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Table 1. Characteristics continued

Important Factors in Determining Location

Factors	Listed First		Listed Second		Listed Third		Total
	n	%	n	%	n	%	%
Jobs: My job	30	29.7	03	3.0	01	1.0	33.70
Spouses job	23	22.8	13	12.9	13	12.9	48.60
Home: Originally from this area	22	21.8	17	16.8	02	2.0	40.64
Quality of life: Social, environment, recreational	04	4.0	16	15.8	18	17.8	37.60
Good schools	04	4.0	07	6.9	06	5.9	16.80
Size of town	03	3.0	02	2.0	11	10.9	15.90
Education	07	6.9	03	3.0	06	5.9	15.80
Relatives & friends	02	2.0	07	6.9	03	3.0	11.90
Location	02	2.0	04	4.0	06	5.9	11.90

Characteristic	N	Percent	Mean	SD
Educational Preparation			2.55	1.47
Nurse Assistant (NA)	38	37.6		
Licenced practical nurse	04	4.0		
Diploma nurse	25	24.8		
Associate degree nurse	14	13.9		
Bachelor degree nurse (BS)	20	19.8		
Year of RN Licensure			77.871	12.329
1949 - 1959	04	4.0		
1960 - 1969	17	17.0		
1970 - 1979	22	21.0		
1980 - 1989	47	46.6		
1990 - 1994	10	10.0		
Missing	01	1.0		
Career			1.059	0.238
Currently Working	95	94.1		
Not working	06	5.9		
Currently employed as RN	94	93.1		
Not employed as an RN	07	6.9		
Employed full-time	57	56.4		
Employed part-time	35	34.7		
Missing	09	8.9		
Amount of part-time hours worked			6.98	12.463

Table 1. Characteristics continued

Characteristic	N	Percent
Employing Agency		
Public hospital	40	39.6
Private hospital	19	18.8
Other Facilities	13	12.9
Nursing school	11	10.9
Community Health	04	4.0
VA hospital	04	4.0
Rural Clinic	02	2.0
Nursing Home	01	1.0
Missing	07	6.9
Nursing Specialty		
Administration/supervision	17	16.8
Intensive Care Nursery (ICN)	17	16.8
Teaching	16	15.8
Ob/Gyn & Women's Health	10	10.0
Surgery	05	5.0
Medical	05	5.0
Psychiatry	04	4.0
Family Health	03	3.0
Infection Control	03	3.0
Quality management	04	4.0
Other	10	10.0
Missing	07	7.0

Work Characteristic	Satisfied		Dissatisfied	
	N	%	N	%
Peer relationship	98	97.0	03	3.0
Challenging job	88	87.1	13	12.9
Independence in my job	86	85.2	14	13.9
Opportunity to improve skills	85	84.1	16	15.8
Social position with job	83	82.2	18	17.8
Cooperation among workers	82	81.2	19	18.8
Higher education opportunity	82	81.1	19	18.8
Working conditions	80	79.2	21	20.8
Continuing education opportunity	79	78.2	22	21.8
Home situation fits my work	78	77.2	22	21.8
Personal policies	77	76.2	22	21.8
Nursing as life work	77	76.3	23	22.7
Present position satisfaction	76	75.3	23	22.7
Respect for individual opinion	76	75.2	25	24.7
Made to feel like a team member	75	74.3	25	24.8
Opportunity to try new ideas	73	72.3	28	27.7
Administration relationship	72	71.3	29	28.7
Job security	71	70.3	30	29.7
Recognition of performance	70	69.3	31	30.7
Work load	70	69.3	31	30.7
Competence of supervisor	67	66.4	34	33.6
Salary and benefits	61	60.4	40	39.6
Stress I have	59	58.4	42	41.6
Advancement opportunities	51	50.5	49	48.5

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Table 2. Graduate Education

A. Important Factors in Choosing to Attend Graduate School

Factors	Listed First n	%	Listed Second n	%	Listed Third n	%	Total %
Personal growth and satisfaction	34	33.6	15	14.8	15	14.8	63.2
Career advancement	17	16.9	21	20.8	04	4.0	41.7
Accessible (ITV)	16	15.8	07	6.9	07	6.9	29.6
Opportunity for autonomous practice	07	6.9	06	5.9	02	2.0	14.8
Job security	05	5.0	07	6.9	10	9.9	21.8
Challenging	05	5.0	05	5.0	08	7.9	17.9
Quality of education	03	3.0	07	6.9	02	2.0	11.9
Financial	02	2.0	08	7.9	09	8.9	18.8
Broaden horizons	00	0 0	02	2.0	04	4.0	6.0

B. Barriers That Prohibited Your Continuing to Attend Graduate School

Factors	Listed First n	%	Listed Second n	%	Listed Third n	%	Third %
Finances	06	5.9	07	6.9	04	4.0	16.8
Family	05	5.0	01	1.0	02	2.0	8.0
Work	04	4.0	02	2.0	01	1.0	7.0
Expectations of instructor	01	1.0	00	0 0	04	4.0	5.0
Time	01	1.0	03	3.0	01	1.0	5.0
Location	01	1.0	02	2.0	01	1.0	4.0

C. What Would a Master's in Nursing Help You Obtain?

Factor	Very Helpful N	%	Not Helpful n	%
Fulfill future plans and goals	94	93.1	04	4.0
Influence changes in health care	89	88.1	09	8.9
Make nursing more challenging	89	88.1	09	8.9
Provide better client care	85	84.2	13	12.9
Opportunity for advancement	83	82.2	15	14.9
Obtain the nursing job I wanted	81	80.2	17	16.9
Increase respect in the community	78	77.2	20	19.2
Obtain better salary & benefits	65	64.3	33	32.7
Increase job security	58	57.5	40	39.6

Table 2. Graduate Education continued

D. Difficulties of Graduate Nursing School

Factor	Very Easy N	Very Easy %	Very Difficult N	Very Difficult %
Receive encouragement from peers	86	85.1	12	11.9
Receive encouragement from family	82	81.2	16	15.9
Respected and valued as a classmate	81	80.2	16	15.9
Receive assistance from the faculty	78	77.2	19	18.8
Receive encouragement from faculty	76	75.2	21	20.8
Able to contact faculty when needed	72	71.3	26	25.8
Have classes on Interactive Television	67	66.4	19	18.8
Learning the clinical skills	64	63.4	29	28.7
Utilizing the library resources	64	63.4	34	33.6
Obtain emotional support to continue	60	59.4	37	36.6
Using a computer	59	58.5	37	36.6
Part of a community of scholars	55	54.4	42	41.6
Learning the academic material	54	53.5	44	43.6
Writing papers	51	50.5	47	46.6
Time off from work to attend school	49	48.6	47	46.5
Finances to continue to attend school	44	43.6	54	53.5
Driving distances to class	37	36.7	60	59.4
Writing a thesis or research study	25	24.8	71	70.3

E. Plans after Graduation

Characteristic	N	Percent
Remain at the same job	44	43.6
Remain in the same town	48	47.5
Change area of work	29	28.7
Change jobs	24	23.8
Get a better job in nursing	24	23.8
Practice in a large hospital	21	20.8
Practice in rural community health	18	17.8
Practice in a nursing school	17	16.8
Practice in a rural clinic	13	12.9
Practice in a small farm area	13	12.9
Practice in a metropolitan area	12	11.9
Move out of state	10	9.9
Practice in a rural poverty area	08	7.9
Practice on an Indian Reservation	08	7.9

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Table 3. Technology For Distance Education

A. Satisfaction with Distance Education

Characteristic (N=72)	Satisfied		Dissatisfied		Missing	
	N	%	N	%	N	%
Teacher comfort with the ITV Network	64	88.8	04	05.6	04	05.6
Interactive Television Network	63	87.5	05	06.9	04	05.6
Visual aids such as overheads	62	86.1	09	12.5	01	01.4
Textbook availability	62	86.1	10	13.9	00	00.0
Teacher's preparation	61	84.7	10	13.9	01	01.4
System Audio & screen quality	60	83.3	08	11.1	04	05.6
Teacher's interactive skills	59	81.9	12	16.7	01	01.4
Individual discussions	59	81.9	11	15.3	02	02.8
Technical support	59	81.9	12	16.7	01	01.4
Class interaction sufficient	58	80.6	13	18.06	01	01.4
Group activities	54	75.0	17	23.6	01	01.4
Access to teacher outside classroom	51	70.8	10	13.8	01	01.4
Getting materials on time	51	70.8	20	27.8	01	01.4
Library availability	48	66.7	22	30.6	02	02.8
Non-verbal feedback responses	42	58.3	28	38.9	02	02.8
Video Taped classes	22	30.56	15	20.8	35	48.6
Nursing Educational Network	12	16.7	07	09.7	53	73.6
Distance Education Effectiveness	69	95.8%	03	04.2	00	00 0

Table 3 continued

B. Barriers to Distance Education

Characteristic	N	Percent
Interactive Television Network Courses		
Time of the courses (same day (n=8), evening (n=4) earlier in the day (n=2), issues in the summer (n=2)	16	15.8
Decrease workload & paperwork	10	9.8
Better coordination and organization of classes	03	3.0
More flexibility of classes	03	3.0
Condense courses that are repetitive	02	2.0
Difficult to interact when we meet only occasionally	01	1.0
Increase ability to see teacher & overhead together	01	1.0
Grades on a standard scale	01	1.0
More breaks in class	01	1.0
Better orientation to courses	01	1.0
No full time semester on campus	05	5.0
Big screen television	01	1.0
Materials to all students at the same time	01	1.0
Interactive Television Programs		
More ITV programs (electives, specialties)	15	14.8
Expand the Network (in ND and other states)	12	11.8
Financial Programs		
More programs (Scholarships & GTA positions)	11	10.9
Interactive Television Faculty		
More site visits by faculty	02	2.0
Faculty or someone available during the day for calls	03	3.0
Mentor needed	01	1.0
More helpful faculty	01	1.0
List of faculty available for advisors	01	1.0
Communication Between All Areas		
Improve interaction between distance students, nursing, graduate school, business office, registrar, registration.	05	5.0
Library Services		
Literature searches and UND id card for access	04	4.0

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The Changing Role Of Moderation In Computer Mediated Conferencing

A review of literature

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Introduction

As computer mediated conferencing (CMC) makes an ever increasing impact in education at all levels it will require moderators with specific skills to facilitate the learning process. CMC, a part of on-line education, is a unique learning situation. It is different than either a face to face classroom or traditional distance education. (Mason and Kaye, p.50) The increasing use and study of CMC is demonstrating many benefits to learning and development of higher cognitive skills. These specifics will be discussed later in this paper in the section *Directions for Future Research.* The above factors demonstrate the need for moderators with strengths in many different areas. This review of literature will discuss present and future moderation skills, roles, and activities, look at directions for future research in CMC moderation, and define implications for the practice of facilitation in CMC.

As the moderator role becomes more sophisticated it seems to move beyond the present conception of question asker and information synthsizer. Increasingly, the terms facilitator, instructor, faculty, designer, and trainer are used synonymously with moderator. In this paper the terms will be used interchangeably as the discussion evolves regarding this important role in CMC.

The author hopes that participants in the distance education field, from beginners to experienced students and faculty, will use this review of literature to enhance their understanding of the moderator role and view that role as a dynamic, evolving position with the potential for major impact on instruction and learning.

Review of Literature

Traditional Facilitation

Prior to the advent of computer mediated conferencing the role of facilitator was given to leaders of small groups. One definition used is:

"A facilitator is a person....hired to design, implement and manage a group problem solving process. The role of the facilitator is to manage a process which allows the participants to work together efficiently and productively in order to be able to focus on the substantive issues." (NM Center for Dispute Resolution, 1992, p. 14)

This source goes on to cite four specific tasks for a facilitator:

- Manage content.
- Manage process.
- Direct the communication.
- Manage the decisions.

(NM Center for Dispute Resolution, 1992, p. 14-15)

Another source defines the facilitator role as:

"...assist members of the group in giving input to the task and in helping the group reach a consensus. ...encouragement of participants and restatement of the task as appropriate,...time management/process types of comments. It is the facilitator's job to get input from members of the group and not to single handedly develop the group action." (Jefferson County Public Schools Staff Development, 1990, p. 13)

This source sees facilitator tasks as:
"Be sure the physical environment is as conducive as possible for interaction...

- Manage the process from start to finish.
- Acts as a resource on group process and problem solving.
- Remains neutral.
- Coordinates the activities of other personnel."

(Jefferson County Public Schools Staff Development, 1990, pp. 13-16)

CMC Aspects of Facilitation

Many of these tasks are appropriate for a moderator/facilitator role in CMC as well, however they must be updated and adapted for the electronic space that CMC occurs within. (Harasim, 1990, pp. xi-xii, in foreword) For example, arranging the physical environment is irrelevant in CMC. The environment is the medium. However, the choice of conferencing software when the moderator has that decision making ability is quite similar to arranging a physical environment for a meeting. (Feenburg and Bellman, 1990, p. 71)

Another task CMC moderators must overcome that is particular to the medium is to overcome participants' fear of "speaking into a vacuum". (Harasim, 1990, p.47.) This phobia occurs when students do not have the face to face feedback that occurs in a traditional classroom. Without visual feedback on their comments and ideas participants in CMC worry about how their comments will be accepted. This fear of public ridicule stifles many CMC students. (Grint, 1989, p. 189) Concurrent with this aspect is the asynchronous, or "rolling present", of CMC. (Harasim, 1990, p.47.) When participants do make comments they do not get the immediate feedback that occurs in other learning situations. Messages are often not acknowledged or responded to for days or weeks by conference participants. (Mason and Kaye, 1990, pp. 34-35) Another issue moderators of CMC must contend with is as basic as participants' typing ability or computer expertise. (Davie, 1989, p. 79; Feenburg and Bellman, 1990, p.71) These factors of CMC must be dealt with as students come online. It is the CMC moderator's role to be aware of these potential issues and work with participants to overcome their misgivings in order to give them the full benefit of the conference they are engaged in.

Moderator's Role in Beginning a Computer Mediated Conference

The CMC facilitator must avoid the authority figure role in a computer conference. (Mason and Kaye, 1989, p. 27; Gunawardena, 1992) Whether faculty, graduate assistant, or peer, the moderator must set a climate conducive to interaction and collaboration. The moderator must coordinate participants' schedules and appear organized as well. (Newman, 1990, p. 106; Gunawardena, 1992, p. 67) He/she should communicate the intellectual climate appropriate to the conference. The facilitator must model scholarly activities and, especially in the early stages, support discussion of issues. This may be done by commenting on user's work or remarks. (Davie, 1989, p. 76) The moderator should provide an introduction and encourage all participants to introduce themselves. (Rohfeld, 1991, p. 159) Course expectations should be stated and explained and protocols for the conference should be established. (Gunawardena, 1992, p. 68) If possible an early face to face meeting among participants may be arranged. This is done to provide personal connections as well as training on software and technology. (Davie, 1989, p. 81; Coppock, 1993) Another author feels face to face meetings should be done intermittently throughout the conference when participants are able to attend. (Gray, 1989, p. 186) After the moderator sets the tone and gets the discussion started his/her job is to back off and let the learner take control of the conference. (Riedel, 1989, p.218) This is not the traditional role of a moderator as defined above. The moderator must stay cognizant of the learner to learner nature of CMC and assume a support role. (Gunawardena and Boverie, 1992, p. 67; Moore, 1989, p. 9)

The Two Roles of a CMC Moderator

Writers in the field of CMC feel that a moderator assumes two roles in their work. One role is that of a technical support person and the other is that of an educator. (Wilsman, 1990, p. 31) Another author defines the two roles as technical engineer and social engineer. Without both functions the CMC will not be completely successful. Sometimes two people assume the roles (Wilsman, 1990, p. 31-32) but usually one person must do double duty. Of the two roles the social is seen as the more important. (Levinson, 1990, p. 7)

The Technical Role.

The facilitator must make participants comfortable with the system and software that the conference is using. (McCreary, 1990, p. 121) Often designing a metaphorical chart or reference sheet help users navigate the conference. (Wolfe, 1990, p. 221) The metaphor used must not be too complicated or esoteric however. One author feels that metaphors can confuse the new learner as often as they help. (Davie, 1989, p. 79) If the conference software allows for branching or topics these must be explained to the users. (Mason and Kaye, 1990, p. 32; McManus, 1993) In using this type of configuration however, it is important to not give too much direction. Learners will rebel if the structural design of the conference is excessive. (Feenberg and Bellman, 1990, p. 94; Heeren, 1993; Gottesman, 1993) It is important that the moderator contact participants early and often regarding system usage, especially if the user is new to CMC or the particular software. (Davie, 1989, p. 81) The ultimate technical goal for the instructor is to make the technology transparent. When this is done the learner may concentrate on the academic task at hand and not have technology problems interfere and frustrate the learning process. (Gunawardena, 1992, p. 59; Rohfeld, 1991, p. 159)

The Social/Educational Role

The CMC moderator must be more than a content expert in the conference they are facilitating. (Paul, 1990, p. 36) If the moderator has the ability to collaborate with experts on a given topic this can more than offset any specific lack of content knowledge that a facilitator may or may not have. (Moore, 1989, p. 10) Setting the social tone of the conference is the most important aspect of being moderator. The moderator must analyze the social characteristics of the group. (Feenberg and Bellman, 1990, p. 77) CMC is a different way of learning and must be treated that way. Issues of control inherent in a traditional classroom change drastically in a computer mediated conference. Learners become active participants in the learning process. (Schieman, et al, 1992, p. 57) The instructor/facilitator must recognize this and change accordingly. (Levinson, 1990, p. 7; Mason and Kaye, 1990, p. 19; Gunawardena, 1992, pp. 68-70)

CMC creates a much more personal environment than a traditional classroom. (Davie, 1989, p. 77) It personalizes a "mass" institutional education. (Mason and Kaye, 1990, p. 21) The group often becomes quite connected (no pun intended) and establishes a feeling of solidarity that may not occur in the competitive atmostphere of a traditional classroom. (Feenberg and Bellman, 1990, p. 91; Newman, 1990, p. 113)

The moderator must manage group discussion through good questioning practices. These include asking leading questions, open ended questions, and refocusing questions when appropriate. (Davie, 1989, p.82) Rather than lecture to a class the moderator/instructor may be working with a series of small groups. (Mason and Kaye, 1990, p. 22) This requires special knowledge of group development and dynamics.

Group Dynamics

The moderator of a computer mediated conference must be cognizant of the fact that groups change. (Feenberg and Bellman, 1990, p. 68) Group development has been studied by Tuckman and Jansen, Peck, and others in studies dating back to the 1940's. Tuckman's classic model of group development (Tuckman, 1965) identifies four stages that groups go through. These are forming, storming, norming and performing. (McCreary, 1989, p. 122) The participant actions in each of these stages are respectively; passivity, conflict, task orientation, and task accomplishment. This paper is not designed to go into this area in depth, but the moderator must be aware of these stages as he/she works with groups. McCreary (1989) likens the role of the CMC moderator to that of the "lead player in a jazz ensemble". She identifies four stages of group development within a CMC. These are successful beginnings, nurturing introductory stages, maintaining the mature conference, and wrapping up the conference. (McCreary, 1989, p. 121) These coincide roughly with the Tuckman model. The important thing the facilitator or instructor needs to keep in mind is the need for successful social dynamics, that the group should "aspire to the highest degree of synergistic productivity". (McCreary, 1989, p. 121)

Participant Dynamics

The CMC moderator must remain aware of the huge individual differences within the conference. In addition to the technical expertise range mentioned previously there will also be a wide variety of personality, emotional, academic, and cognitive levels. (Davie, 1989, p. 79; Ehrman, 1990, p. 10, 18; Newman, 1990, p. 112) Because of the individuality of the learners courses need to remain flexible and the moderator needs to support this. (Schieman, et al., 1992, p. 60)

Different participants will respond to humor or sarcasm in many ways. For this reason it is wise to not use either in one's remarks. Without the visual, or face to face, clues available in a traditional classroom meaning is often misconstrued. (Davie, 1989, p.82)

The moderator must acknowledge age, gender, and affective variables. (Ehrman, 1990, p. 17) For example, older students may need more technology support though they may operate effectively at high cognitive levels. Younger students may be comfortable with the technology, but need more support in working through the academic activities. (Newman, 1990, p. 114) Students will have different levels of motivation and anxiety. (Ehrman, 1990, p. 17) Status cues, or the relative rank of participants must be taken into account. (Coppock, 1993) Technical expertise may confer more status on some participants. (Grint, 1989, p. 191-192) The moderator needs to accept the fact that "lurkers" will be in the conference and may never participate with comments. (Gottesman, 1993) Lurkers and latecomers alike must be acknowledged and welcomed. (Greddol, 1989, p. 236)The moderator must recognize growth in each student, acknowledge their contributions, and encourage further thinking. He/she must be a coach and humanizer within the computer mediated conference. (Gunawardena, 1992, p. 68; Rohfeld, 1991, p. 159)

Time Considerations

In addition to the qualities stated above the moderator needs other logistical skills. The moderator must have time to do an effective job. Being a CMC facilitator requires frequent time online. (Gunawardena, 1992, p. 68) The moderator has an obligation to respond when asked (Levin, et al., 1990, p. 191) and should not let other factors intervene. One researcher feels that moderating a conference for 20 students is a full time job when the work includes doing research, answering content questions, and contacting experts. (Mason and Kaye, 1990, p. 35)

Participants will also have time demands and constraints. One of the main benefits of CMC is its asynchronous nature. The moderator needs to recognize students' varied and conflicting schedules and understand that this will lead to more spread out and sporadic conversation as well as latecomers to a conference. (Newman, 1990, p. 105; Greddol, 1989, p. 236; Gottesman, 1993)

Directions for Future Research

Computer mediated conferencing is still an educational field in its infancy. Better conferencing software is being developed constantly and as the medium evolves from a traditional classroom focus to a new view of learning and education new areas will need to be researched.

The learner collaboration that occurs in computer based conferencing is one such area. How does collaborative learning help individuals learn? What are the mediation variables which create an emotional and intellectual climate conducive to high level cognitive learning? There are mechanisms directly effecting cognitive processes. Learners are actively constructing knowledge through verbalization, cognitive restructuring and conflict resolution. (Harasim, 1989, pp. 51-52) Research needs to be done in studying and designing curriculum tools that will help create rich online learning interactions. (Harasim, 1990, p. 69) Facilitators need to participate in and learn from this research to enable CMC participants to grow in their thinking and learning.

Researchers are learning that working in groups causes new kinds of learning. Leaps in understanding occur through group activity. (Mason and Kaye, 1990, p. 19) How does the group interaction cause these cognitive leaps? How can the moderator encourage this?

Computer mediated conferencing may be viewed as one of civilization's great cognitive steps. Along with spoken language, alphabetic writing, the printing press, and electronic audiovisual media, CMC may change history and culture in unforeseen ways. (Harasim, 1989, p. xix and Levinson, 1990, p. 10) How will moderation and instruction change?

Hypertext, or the non-linear use of electronic text to make cognitive connections has been in use for almost 10 years. How can the moderator use this in CMC? How much structure should the moderator provide? Who controls the structure? (Wolfe, 1990, pp. 223-225)

These are but a few of the research directions necessary in the area of CMC moderation.

IV. Implications for Practice

CMC leaders must push for higher developmental levels in the participants. (Harasim, 1989, p. 53) Through the study of cognitive models such as Bloom and the study of high level questioning strategies moderators will lead the way into stronger learning situations.

By providing moderators with CMC navigational tools of increasing sophistication institutions will enable learners to make complex connections not possible in a linear based conference software system. (Wolfe, 1990, p. 216)

New models for the task of moderation or facilitation have begun to evolve. One is that of "diffusion manager". This person creates intentional online communities for large organizations, whether corporate, educational or governmental. (McCreary, 1990, p. 118) Another model is that of "social network designer". This role would be that of successfully placing groups online. The social network designer would need to have a "powerful body of practical knowledge" in specific CMC social technologies. The areas of knowledge include:

1. Selecting systems, training techniques, and materials adjusted to the proficiencies of groups.
2. Selecting software and systems with the features best adapted to the needs of groups.
3. Constructing effective conference architectures by breaking down ;the different concerns of the group into the optimal selection of conferences.
4. Anticipating the leadership needs of online groups, providing leadership, and developing the moderating skills of members.
5. Starting conferencing activities effectively, with all the members of the group clear on the agenda and procedure of the online exercise.

This role is evolving at this writing. (Feenberg and Bellman, 1990, pp. 69-70) The moderator role is one grounded in the past yet moving into the future with computer mediated conferencing. By acquiring new skills commensurate with better software, technical systems, recognition of higher cognition, and social needs the moderator of CMC in the future has the potential to help push learning and education into directions not yet envisioned.

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Issues in Professional Development in Computer Mediated Communications

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Abstract:

The technology revolution has left many professionals in the field of education with a need to upgrade their technical skills. Knowledge and skills in Computer Mediated Communication is becoming a basic competency necessary for successful participation in professional and educational activities. However, it is often the case that equipment is purchased while the training necessary for such professional development is neglected. Faculty resistant to learning new technology and the neglect of Faculty as a potential resource, have been discussed by Distance Education experts (Gunawardena 1990, Dillon & Walsh 1992), but learning styles, learner support, and learner preferences have largely been studied from the perspective of students (Gunawardena & Boverie 1992, Dillon, Gunawardena & Parker, 1992).

Educators who have been successful in traditional classrooms with traditional methods need to be brought into the 21st Century in ways that they find comfortable. This is especially true for those Educators who "just missed" the technology revolution in their own undergraduate and graduate education. An important factor in their hesitance is the unfamiliarity with the technology (Gunawardena 1990).

In order to determine the preferred learning environments, a survey was conducted in the Fall of 1993 of Faculty, K-12 Teachers and Graduate Students.

Issues in Professional Development in Computer Mediated Communication

Much has been written about the Technology revolution and the potential benefits of computers in education. Professional Development programs for educators have focused on Computer Literacy which included the use of computers for drill and practice, personal productivity (word processing, spreadsheet, database), and the use of educational software for problem-solving and simulations (Geisert 1984). Computer mediated communications expands the concept of computer literacy and makes educational contexts which were previously the material for Star Trek episodes, accessible to the larger population. The ability to communicate with colleagues and students around the world via e-mail, accessing and searching library resources, and collaborative work groups by computer conferencing are just a few of the potential benefits of "networking" for educators and their students (U.S. Dept of Ed 1993; Waggoner 1992; Harasim 1993; Stout 1991). Distance Education via Computer Mediated Communication offers many opportunities for innovation and growth including professional development, field based training and actual credit bearing graduate courses for educators (Knapczyk 1991, Moore 1989, Verduin & Clark 1991, Kerka 1989).

New preservice teachers will most likely have had a course or two in Technology in the classroom and will therefore be able to integrate new technologies (NMETPC, 1991). The task becomes one of how to structure learning situations which address the transformation that the technological revolution has created. As illustrated by the aforementioned vignettes, the use of the computer as a tool for communication is one that cannot be ignored. It continues to transform formal and informal contexts such as the workplace and school (Howard, 1993). However, faculty, teachers and graduate students who are products of educational institutions of the pre-information society generation are finding themselves in learning contexts in which the majority of their students are more familiar with computer technology than they are reminiscent of Margaret Mead's discussion of post figurative societies (Mead 1970). The rapid shift from an industrialized society to an information society (Toffler 1980, Toffler 1990, Collis, Veen, & DeVries 1993) has left many educators feeling overwhelmed by the changes taking place in their profession. This is especially true for those educators who are in their forties or older and whose own education was without the emphasis on computer technologies.

> "There is a tendency among teachers to use methods of teaching through which they were taught. If teachers do not experience the effective use of information technology in their college and post-college education, they will tend to practice traditional methods of teaching... To Make use of information technology in all course offerings of a teacher preparation program, faculty of colleges of education have to become competent in the use of technology in teaching their own courses." (Hefzallah 1990, pp 213-214)

These educators may also perceive the introduction of new technologies as a threat to their profession (Postman 1992) as well as to their competence (Needham 1986) and may not be willing to invest the time and energy to learn something which might very jeopardize their job security. The challenge is to create learning situations which allow for the learning of skills as well as the changing of attitudes (Offir, Katz, Schmida 1991).

Problem Statement

In order to increase the success of faculty and professional development programs in Computer Mediated Communication, they must be organized in a manner consistent with participant needs and preferences (Merriam & Caffarella 1993).

Methodology

In order to determine the preferred learning environments a survey was conducted of a total of 50 subjects.

Sample Selection

Sample consisted of University of New Mexico Faculty and Graduate Students of the College of Education, and Elementary School Teachers from both Bureau of Indian Affairs and Albuquerque Public Schools. Demographics of Status, Gender, Age, Ethnic Group, and Experience with Telecommunications were collected. N= 50, Description of n's follows:

Status		
Faculty	16	32%
K-12 Teacher	16	32%
Graduate Student	18	36%
Gender		
Male	13	26%
Female	37	74%
Age		
20's	2	4%
30's	11	22%
40's	30	60%
50's	7	14%
Ethnic Group		
European-Am	28	56%
Native-Am	4	8%
Hispanic-Am	12	24%
Asian-Am	3	6%
Other	3	6%
Experience		
New user	10	20%
Occasional	23	46%
Frequent	11	22%
Expert	6	12%

Our instrument was a Likert Scale Survey (1-5 response scale from strongly agree to strongly disagree) with survey questions focused on Attitude toward Computers, Preferred Learning Contexts, and Preferred Instructor Characteristics. Participants were asked to sign a consent form and complete the survey without further instruction. The survey was conducted at UNM during the month of November 1993. All 50 surveys were considered for this study.

Description of Analysis

Means were calculated for each of the following variables:

1. Attitudes toward computers - from a high score 5 representing high computer anxiety to a low score of 1 representing computers as an integral part of subjects life.
2. Preferred Learning Contexts - course for credit, workshop, small group, private tutoring, self-study with manuals, and online instruction.
3. Preferred Instructor Characteristics in the areas of:
   a. Delivery of Instruction (Andragogy/Pedagogy) - Able to communicate in technical terms, able to simplify technical terms, expert, credentialed, able to individualize, well organized.
   b. Immediacy/ Social Presence - Enthusiastic, warm and friendly, sense of humor, patient, approachable.

In addition to the overall means for attitudes, preferred learning contexts, and preferred instructor characteristics, we performed One way ANOVAS (Between Subjects Design) to check for variance in the scores based on Status, Gender, Ethnic Group, Age, and Experience.

Significant Findings

Experience:

Significant difference between levels of experience and attitude towards computers with higher levels of experience associated with lower levels of anxiety. (F_{obs}=7.24, p=.004, df= 3,46) A post hoc Scheffe F-test showed differences to lie between new and frequent users and between new and expert users.

Significant difference between levels of experience and the preferred instructor characteristic of credentialed in computer science.

(F_{obs}=6.967, p=.0112, df=1,48) A post hoc Scheffe F-test showed the difference to lie between new and expert users. Expert users indicated that Credentials in Computer Science were less important while New users indicated that Credentials in Computer Science were important preferred instructor characteristics.

Status:

Significant differences were found between Faculty, K-12 Teachers, and Graduate Students in the preferred instructor characteristic of Credentialed in Computer Science. (F_{obs}=7.687, p=.0013, df=2,47) A post hoc Scheffe F-test showed significant differences to lie between the Faculty and K-12 Teachers. Faculty indicated that Credentials in Computer Science were less important while K-12 Teachers indicated that Credentials in Computer Science were important preferred instructor characteristics.

Gender:

Significant differences between males and females in several elements of the preferred instructor characteristics, specifically in the immediacy characteristics: patient, warm and friendly, and approachable with females preferring these instructor characteristics more than males.

Warm & Friendly	(F_{obs}=7.601, p=.0082, df =1,48)
Patient	(F_{obs}=13.825, p=.0005, df =1,48)
Approachable	(F_{obs}=9.72, p=0031, df =1,48)

There was a significant difference between males and females and the preferred context of small groups with females preferring the context of small groups more than males. (F_{obs}=6.967, p=.0112, df =1,48)

There was a significant difference between males and females and the preferred instructor characteristics of ability to simplify technical terms with females preferring this characteristic more than males. (F_{obs}=6.906, p=.0115, df=1, 48)

Interpretation of Results

1. Attitudes: In terms of reducing computer anxiety, it is not surprising to find that experience influences the attitude toward computers, the more experience, the less anxiety.

2. Preferred learning contexts: Overall preferences with regard to learning contexts for all groups are interesting in that the most preferred context was a small group of peers or colleagues. The next most preferred contexts overall were workshops(5-10 participants), private tutoring (one to one), and online tutoring. The least preferred contexts overall were self-study and a course for credit.

3. Preferred Instructor Characteristics: The overall means indicate a preference for instructors with high immediacy skills such as patience, approachability, enthusiasm, warmth, humor as well as good teaching skills such as ability to simplify technical terms, well-organized, and ability to individualize instruction.

Gender differences were found in the instructor qualities of warm and friendly, approachable, and patient with females preferring those qualities more than males.

Expert vs Credentialed:

While the overall mean for the characteristic of Expert in telecommunication is high at 4.08, the overall mean for Credentialed in Computer Science is low at 2.34 indicating a distinction between credentials and expertise. In fact, one the respondents wrote "I believe that being expert is more necessary than credentials". Likewise the ability to communicate in technical terms was seen as less important overall than the ability to simplify technical terms.

Comparisons to Previous Research

The research in adult learning, and most notably the theories of "Andragogy" support the findings of this study.

Some of the issues in adulthood with regard to new learning involve the shift away from contexts of "schooling" with an emphasis on formal courses, competition and "credentials", and the shift toward more learner defined contexts and outcomes (Cross 1981).

The effects of gender on adult learning environments(Beer & Darkenwald 1989 in Merriam & Caffarella 1991) has been studied in college classrooms, and research on social climate in adult learning reveals that instructor characteristics such as openness, and a sense of mutual trust were factors in the quality of the learning experience (Merriam & Caffarella 1991).

Malcolm Knowles suggests four fundamental characteristics of learning environments which are helpful to adult learners.

1. respect for personality
2. participation in decision making
3. freedom of expression and availability of information
4. mutuality of responsibility in defining goals, planning and conducting activities and evaluating" (Knowles 1980, p.67)

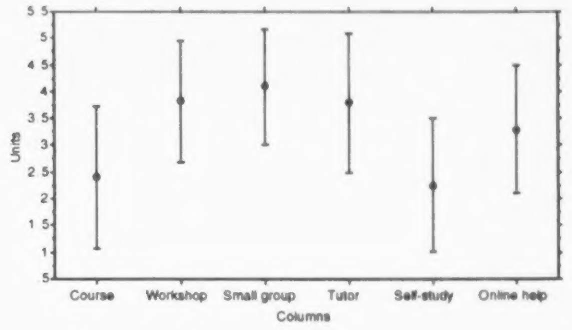
Suggestions for Further Research

Further research should be done in the area of professional development in Computer Mediated Communication specifically due to the technical nature of the content and the anxiety which is evoked for many first time users. The interaction of Immediacy characteristics and learning in the specific area of Computer related learning would also be important in the design of Faculty and Professional Development programs . If Educators are to begin looking at options of distance teaching, a major first step is to assist them with learning Computer Mediated Communication.

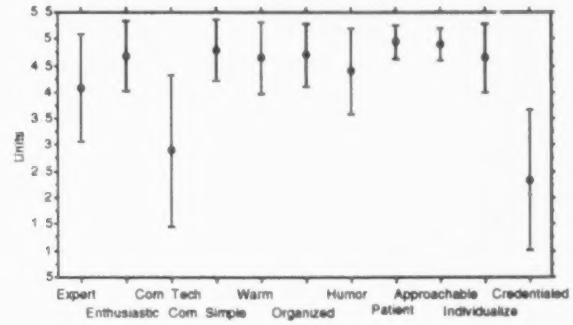
Summary

Professional development for educators in Computer Mediated Communication is a necessary and inevitable step toward full participation in the Information Age and the potential of Distance Teaching. Faculty, K-12 Teachers and Graduate Students - adults who have achieved a very high level of success in their professional lives, are most capable of determining the learning contexts and instructor characteristics which will be most effective in the transfer of new technical knowledge and skills. Therefore, it is the opinion of the authors that professional development programs for educators, should place these "experts" at the center of their own learning.

Preferred Learning Contexts - one standard deviation



Preferred Instructor Characteristics - one standard deviation



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Designing for Electronic Interactive Publications

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The Agricultural Communication Service at Purdue University is currently exploring many facets of distance education. Some, such as IHETS satellite technology and the INTERNET computer network, are currently being appliedand refined for specific uses by the School of Agriculture.

Working very closely with the Cooperative Extension Service in Washington D.C. and the Purdue University Cooperative Extension Service, we supply over 3,000 different topics of information/materials nation-wide and for the state of Indiana.

With the explosion of technology and its new capabilities, it is only a matter of time before the traditional publication is transformed in order to satisfy new and increased demands from a more sophisticated audience. History Paper has long been the major vehicle of the distance education resource with television, of course, creating its own niche in the classroom. Traditional educational materials and instructional design patterns have followed the linear presentation of information for many years. Outline and organization followed the best sequence for teaching, informing, and building on certain fundamental concepts. Design and layout also has evolved basing its form and function on the paper/linear approach of teaching and informing.

But suddenly, things don't have to be that way any longer. Instead of designing for the masses, there is mass design for the individual. It's called interactive electronic design. The standard linear approach can now be customized based on specific choices that an individual makes while learning about a particular subject. Details can be gained at any point along the way and paths back to mainstream topics are always available.

This is not to say, however, that all current theory relating to instructional design is invalid. In actuality, we are finding that even though there is much potential in interactivity, there must still be certain guides to ensure that the information being searched by the user is logically connected. The traditional methods of document preparation, such as writing and designing, take on new perspectives and challenges when approached for an electronic document. On the screen, for example, words will more than likely take a lesser position in a document than photographs or graphics. Audio may also help to reduce the amount of reading necessary. Video may replace some photography and be able to demonstrate procedures more effectively. These and many other factors must be evaluated based on audience characteristics in order to define the new skills and templates that go into planning for the screen.

Audience Analysis

The specifics of the audience are critical to have no matter what problem is being solved. In this case the evaluation is very broad-ranging. Our primary audience, as mentioned earlier, includes the citizens of Indiana. Age ranges anywhere from 10 years old to senior citizens and ever age in between. The given profile of our clients being primarily agricultural an rural no longer applies and has been changing rapidly for the last decade. The Purdue University Cooperative Extension Service still provides much farming/production information to the people who require it, but a whole new segment of research and development has been devoted to topics that touch all walks of life. Some examples include water quality, consumer education, food and nutrition, food safety, and youth development programs. We realize, at this time, that there is a sizable portion of our audience that is just now becoming computer literate. But at the same time, there is a secondary audience known as county extension educators, who are responsible for informing and promoting education to the citizens in each county in Indiana. This audience is familiar with the computer as a learning tool and could use the electronic interactive publication as a self-help aid in their teaching efforts. Because of this wide range in criteria, we have at this time decided to explore two different methods of interactive publication distribution; the NSIF Internet/Mosaic search and retrieval medium and CD-ROM. Each method has its good points as well as its limitations. The newness of our research requires that we be prepared to respond to which ever direction evolves into the platform of choice by our clients.

Outside of Indiana, there is also a large potential for other educational institutions, libraries, and other similar sources to utilize, distribute, and archive information produced from Purdue. Many national institutions, such as the USDA, often are cooperative partners in certain areas of research and help to support wide distribution of materials.

Design Strategy

There are three general objectives to be met in designing for interactive media. The first is to develop a learning model or graphic interface to help users to navigate through the electronic publication. The second is to communicate information graphically through illustration, typography, photography, and layout. The third objective is to integrate video, sound, and animation where necessary to complete the communication process. For our prototype publication, we chose a title (from our offset printed list) that would have a far-reaching relevance to a wide range of users. With recent natural disasters of floods and earthquakes occurring throughout the country in recent years, a Food Safety publication entitled Keeping Food Safe During Emergencies, was selected. This would provide a range of audience, yet establish a definite need for finding and utilizing the information. In other circumstances, there could be a need for promoting or "marketing" a publication based on the audiences not knowing their need for the information. The original publication (ink on paper) contains very specific information on preparing for an emergency, food storage, and sanitizing certain foods that have gone through specific disasters. It also discusses various methods for food preparation without the conventional cooking sources such as electricity. There are six sub-topics in the publication which are covered through text and three tables. There are two serious draw-backs with the publication as it currently exists. First, there are many portions of several different sections which require the same procedure or instructions each time. These are repeated in each section. In the interactive pub, there can be a link to one grouping of screens and the viewer can access it from each of the sub-topical areas. The second and most serious flaw within the printed publication is that treatment of process-type information is very difficult to show. Washing/disinfecting of can goods or food preparation without electric power could benefit from animation or video clips and audio. Visuals would most certainly help to convey some of the more abstract concepts as well as being more appropriate and effective for audiences with lower reading abilities. Not to be forgotten also are the more visually receptive viewers, particularly younger users. This comes as no surprise as the "video game" generation has been anticipated for years.

Making It Work

The content of the program was followed closely from the original publication, but the idea of linear flow was questioned from the beginning. The traditional teaching methods of presenting one and two before three can be learned/understood is still valid. But the whole benefit of interactivity which allows you to go where you want when you want also needs to be added into the mix. After analyzing content and working with the authors and specialists, it was decided that there were places in the program specific to the topic when the viewer should be given full control over where they go and what they learn. But when engaged in a process that requires specific steps of progression, the user would be restricted until that process is completed. Brainstorming the sequences and their potential links began with an outline of the printed publication and sketching of flow charts. We found that when designing an interactive piece, flowcharts function in the same way as thumbnails do in publication design. They can create a blueprint for not only how each segment flows within itself, but also show how all segments will be linked together and accessed. Logical sequences of events will not only create a smoother flow within the pub, but will also make the learning process that much more effective. It was decided to make each of the six topic areas into separate tours or segments. The current approach being tested is that of including an introductory frame (possibly with a background video clip of some disaster footage), navigation instructions, and access information being available before each tour is begun. Explanations of other related topics, a glossary, and perhaps a bibliography are also potential components that could be included.

Consistency

Once the general framework of the program was completed, the next step was to begin to develop the visuals. A basic template for format is being developed to keep necessary components such as selection buttons, informational text, and visuals in consistent positions on the screen. Then a navigational system that can be easily followed must be designed. Potential problems here deal with buttons or systems that are too clever or less than obvious in their operation, thus discouraging the viewer from accessing some parts of the program. On the other hand, navigational systems that are too straight-forward, may squelch some of the sense of exploration and adventure in more sophisticated viewers. Other needs that are necessary are icons which allow access into more specific information within a segment and they must be designed with screen organizational hierarchy and user-friendliness in mind.

Where Do We Go From Here?

At this point in time, we are beginning to develop the visuals for the introductory screens and the segment beginning screens. Some sources and visuals being considered are still shots of weather patterns, tornadoes, and hurricanes will be obtained from the National Weather Service and NOAA. Our plans, at this time, are to scan them at 72 dpi and make final adjustments in Adobe Photoshop. Reflective art will digitized on a HP flatbed scanner and transparencies on a Barneyscan (at 640 x 480 pixels) and converted from 24-bit to 8-bit color with 256 colors. Due to concerns of too much time in between operations, the decision to scale down the resolution to allow for speed was made. This will limit the color and graphic effects, but should keep this moving faster. Graphics will be created in Adobe Illustrator and refined in Photoshop. There are still many questions to be answered, such as type and text treatment, video and audio integration, as well as how everything will fit together. We are utilizing the skills of educational designers, editors, graphic designers, and computer animation specialists to create these new materials. This is an on-going process and the final chapters are far from being written, but much of the information being gained will surely pave the way for more extensive and effective educational publications.

Electronic Journaling: Innovation Research for Development and Policy Making

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More and more frequently today continuing professional education needs are being addressed using distance education methods. These distance education methods frequently utilize electronic telecommunications via satellite TV or telephone lines. For academics, these needs are usually addressed in professional meetings, publications of proceedings and in academic journals. Recently the academic journal publication enterprise has also begun to utilize electronic telecommunications, publishing journals electronically and distributing them over the Internet.

In November, 1992 the Board of Directors of Extension Journal, Inc., publishers of the, decided to test the feasibility of electronic publication. The Journal of Extension (JOE) has been published as a professional reference intended primarily for Cooperative Extension Service (CES) personnel in the United States since the early 1950Δs. Originally, the format and content of the Journal was fairly conventional for academic journals, publishing articles reporting on research in areas of interest to CES professionals. Each submitted article was peer-reviewed and was most often conducted by academic personnel in land grant universities. After nearly twenty years in this form, the Journal was redesigned to be more attractive to the CES fieldworker or front line personnel working in county-level offices or on a multi-county basis. While continuing to publish research articles, the Journal editors added other features such as ideas for educational programs that had been used successfully and new educational tools that could be employed to increase program effectiveness. The revamped Journal aecisions to be made by the JOE Board and administrators of CES in the state and federal organizations. The purpose of the evaluation of the electronic JOE pilot project was to provide information to significant stakeholders to help with decisions about the future forms (electronic and non-electronic) for publication of the Journal of Extension. In the early planning stages for the electronic pilot test, some stakeholders also asked fundamental questions about the readership patterns and uses of the hard-copy published Journal. To help with decisions about the printed Journal and provide a benchmark for comparison with the electronic version, the evaluation design included a readership survey of a national random sample of subscribers.

Information was provided to significant stakeholders to help with decision making about the Journal's future. Significant stakeholders are those parties who have a part in making decisions or are most affected by decisions that are to be made about the future of the Journal. For purposes of this project, stakeholders were identified as:

Journal of Extension Board of Directors
Extension Committee on Organization and Policy (ECOP)
State Extension directors and 1890 administrators
University of Wisconsin-Extension (UWEX pilot study group)
Extension Service-United States Department of Agriculture
Journal of Extension subscribers/readers

Early in the planning of the pilot project and the evaluation information needs of the identified stakeholders were determined. Based on early discussions with many of the stakeholders, the following were identified to be at least some, but not necessarily all, of the basic informational needs:

Costs/revenues
Satisfaction
Utility (short- and long-term)
Capability and ability

In terms of costs, stakeholders needed to know the total costs associated with producing and distributing the electronic Journal as well as comparative costs for producing and distributing the existing printed Journal. Revenue sources and projected amounts needed to be identified.

An extensive literature review failed to locate any examples of professional refereed journals that have converted from a hard-copy published form to an electronic form. Thus, there is an extremely limited experience base for judgments about performance and satisfaction. Asking current subscribers to change their behavior from receiving and reading a glossy printed publication to receiving and reading materials on a computer screen or printed on a computer printer involves both a learning curve and questions related to basic subscriber satisfaction and attitudes toward the use of telecommunications.

Another important aspect of the evaluation was to determine the utility of the electronic Journal. Particular concerns included the uses made of the information transmitted by the electronic Journal, the extent of use, and how the material was stored and retrieved by the Extension staff.

A large portion of the existing subscriber base for the Journal, (CES staff located on land grant university campuses and in county Extension centers throughout the United States) is just now becoming engaged in significant computer usage. This presents two real questions about capability and ability. Capability relates most directly to the availability of needed computer equipment at the Extension office to access the electronic Journal. Extension offices throughout the United States that have computer equipment have a wide variety of types and models. This lack of equipment uniformity and capability presented some real challenges to the designers of the electronic JOE pilot project. For example, some Extension offices have minimal electronic capabilities and thus are limited to receiving electronic information using electronic mail and text in ASCII format. Similarly, Extension staff throughout the United States have equally varying abilities in using computer equipment to access and manipulate information and data made available through the various computer information servers such as Almanac, Gopher, WAIS, and World Wide Web. Accessing an electronic Journal was the first opportunity many, if not most, Extension staff had in retrieving information using computer-based telecommunications. Thus, the electronic Journal pilot project faced a learning curve that had to be factored into the decision-making process accompanying the project.

Among the broader decisions to be made by the stockholder groups are matters related to:

Hard copy vs electronic distribution
Timing for electronic implementation (transition)
Support and training required (by states)
Technical format(s) for electronic transmissions
Financial implications

The general evaluation design is similar to that discussed by Scriven (1981) as a product evaluation. The electronic JOE is treated as a product possessing a number of features intended to be useful to consumers. These features provide the focus for the evaluation instruments and help organize the feedback provided to UWEX for the pilot. Since the electronic JOE represents an example of "product development," Scriven's specific suggestions have been modified appropriately. Not until December 1993 were the final elements of the electronic JOE as a product finalized; this model became fully appropriate then.

A number of design features were identified for the pilot test evaluation to make the evaluation positive and useful. These include:

Formative and summative information
Frequent data collection
Electronic data collection
Sampling of "subscribers"
Testing of pilot state cooperators
Qualitative and quantitative data
Tightly scheduled evaluation performance

Therefore, the research consisted of several components including:

Data collected from a panel of lead users after each issue was published
Content analysis of comments posted to a listserver
Postal mail survey of printed copy subscribers
Email surveys of CES staff in pilot states and self-subscribers
Literature review regarding electronic journaling

Each of these component research activities is discussed below.

Printed Copy Readership Survey

To interpret an assessment of levels of satisfaction with the electronic version of the Journal of Extension and differences in use patterns, potential obstacles to electronic access, and cost factors, the evaluation team designed and completed the first comprehensive readership survey of the Journal's subscribers. From the subscriber list of over 10,000, evaluators drew a random sample of 550 to provide an estimate of reliability of +/- 1%. The sample was surveyed using standard mail survey techniques (Dillman, 1978), resulting in a return rate for usable instruments of over 70%. The returned surveys were analyzed and results shared with the Journal board in August 1993.

Pilot States Survey

As indicated above, Extension staff located in the states of 13 pilot test institutions were surveyed to determine from subscribers the reactions they had to receiving the Journal in an electronic format. Pilot test institutions received only the electronic versions of the Journal during the pilot year. Both qualitative and quantitative data was collected as part of the evaluation research.

A random sample of 400 individuals was drawn from a sampling list of about 6,000 Extension staff members provided by the 13 institutions that constitute the pilot test population. This sample size exceeds the number determined to provide a confidence level of +/- 1% with a 60% response rate. This survey was distributed via electronic mail using an adaptation of Dillman's total design method (1978) in early October 1993 and completed in November. The adaptation was straightforward in that it included a complete instrument in the second electronic contact rather than a reminder only.

Information sought in the survey of electronic users is divided into six general categories:

Personal data
Hardware setup
Electronic awareness
Technical capacity
Individual issue access and satisfaction
Archive access and satisfaction

Survey of Self-Subscribers to the Electronic Journal

A number of Extension staff and others located outside the 13 pilot test institutions, including interested international parties, voluntarily subscribed to the electronic Journal. The UWEX pilot test team designed a means to electronically identify the self-subscribers so that the Missouri evaluation team could also examine the self-subscriber group demographics and interests as part of the pilot test evaluation. This information will be helpful and useful for developing future marketing strategies for the electronic Journal.

A separate survey was conducted among a sample of over 600 self-subscribers to the electronic Journal. Approximately two-thirds of the self-subscribers are university based and one-third are non-university based; this distinction was used to stratify the sample. Similarly, more than one-quarter of the self-subscribers are international.

Lead User Group Surveys

Since the pilot test activities being conducted by the UWEX were developmental, the University of Missouri-Extension evaluation team identified a means of providing timely and relevant information to facilitate the development process. This was accomplished primarily through the formation of a Lead User Group (LUG) that was surveyed following each issue of an electronic Journal.☐ Information from these surveys was summarized and provided to the UWEX pilot team to be used in making modifications for subsequent electronic issues.

Five issues of the Journal, plus a five-year archive (1987-1992), were distributed electronically as part of the pilot test. The Lead User Group was asked to provide assessments and reactions immediately following the electronic transmissions. Both UWEX and Missouri-Extension were involved in designing the LUG survey instruments. Survey instruments were finalized at Missouri
and transmitted electronically to the Lead User Group who in turn responded electronically or by fax to Missouri. In the early stages of the evaluation, the Lead User Group was divided into two subgroups: non-directed and directed respondents. All members of the Lead User Group responded to a similar set of questions. In addition, the directed subgroup was also asked (directed) to make some specific comparisons between the hard-copy published Journal and the related portions of the electronic version. These comparisons pertain to reader satisfaction related to visual attractiveness and ease of reading. This information helped the UWEX pilot design team for knowing what modifications to make in the electronic Journal to increase its level of reader satisfaction and utility. Formative feedback information was also provided directly to the UWEX pilot team electronically by recipients of the electronic Journal who subscribed to an Internet electronic JOE message group. The lead user group provided immediate and critical feedback for use by the "product" developers and evaluators related to the Winter 1992 and Spring and Summer 1993 issues of the EJOE and the five-year archive.

Content Analysis of Comments Log

As a companion effort to the Almanac server that supported the electronic JOE, a listserv comments log was created. The purpose of this listserv was to provide a means of communication for users and subscribers to raise questions, make suggestions, or discuss different aspects of the pilot test of the electronic JOE. The listserv provided a sort of electronic, real time letters to the editor function. The comments log was used extensively. People posted items praising the experiment and raised objections to the change. Suggestions for improving the product were made as were procedural ideas for using the electronic files once retrieved from the Almanac files. In many cases, people put messages on the listserv that asked for technical assistance; in every case UWEX technical staff replied with detailed instructions or an explanation for why a specific problem could not be solved in the current environment. These comments supported the technical efforts to expand access to the electronic JOE by creating Gopher versions and initiating work on a WWW version.

Data Collection

The data collection method used was Dillman's total design method for mail surveys (1978). For the survey of printed JOE subscribers, the mail survey included an initial personal letter and instrument followed by a post card reminder and later, another personal letter and instrument. The survey was conducted for a sample drawn from the list of all subscribers of record in 1992. Over 500 subscriber names were drawn for the survey and a survey response rate of 73% was attained.

The total design method was modified for use with electronic mail to conduct surveys for a sample of CES staff in pilot states who had been notified of the electronic Journal's availability. Email surveys were also sent to a stratified sample of self-subscribers using the same modifications. Instead of sending a post card reminder as the second mail contact, a second announcement letter and instrument was distributed to those in the sample who had not yet responded. Otherwise, the approach paralleled Dillman's recommendations. For the pilot states sample, a response rate of 43% was attained. For the self-subscribers a slightly lower response rate of 41% was attained.

The lead user group was surveyed using electronic means also. An instrument and instructions were distributed about 21 days after the release date for each issue of the electronic JOE; only one instrument was sent to this group. They had been contacted prior to the project's data collection effort began to alert them to their designation as a lead user, the purpose of the project, the need to respond quickly so that useful information could be relayed to the technical project team at UWEX.

The use of an email survey approach was considered appropriate for this experiment in electronic journaling. However, the researchers found that the total design method cannot be followed without some modifications. This method emphasizes the need to personalize the communications to sampled individuals, but email addresses do not permit personalization. It is also very labor-intensive to track returns to eliminate subsequent and irritating repeat communications with individuals who have already returned their surveys. Additionally, many e-mailed instruments came back via fax or postal mail; some were probably returned this way to try and protect anonymity and some because recipients could not determine how to fill out an instrument on the screen and return it without losing information. On the other hand, it was very cost effective to conduct the data collection via email as the elimination of instrument reproduction and assembly costs, and postage constituted a significant savings to the project budget. As users become more familiar with various email procedures and anxiety is reduced, email will likely be an attractive alternative for specific data collection purposes. E-mail's use would be enhanced if software were available to automate the distribution, collection and coding of data to build a file without human intervention.☐

Survey Results

This effort resulted in the assembling of a large quantity of data and the generation of numerous reports to stakeholders to facilitate decisions about product development and future project status. Those familiar with the conventions of evaluation research will note that both sets of interests involved formative evaluation. Since the characteristics of the product i.e., the electronic JOE changed with each issue, it was difficult to maintain the continuous communication necessary for timely decisions to be made. Future efforts of this sort should utilize personnel devoted full time to the project; the speed of electronic communications means that data are ready for analysis in very short time spans and stakeholders expect to hear the results quickly! This section reviews some of the most pertinent findings for project design and policy making.

Project Design

Several general points can be made from the readership survey data. First, though most of the sample (65%) said it was important to have a professional peer-reviewed journal for Cooperative Extension, only about 30% of the subscribers were willing to pay for the Journal. Second, they used the Journal as an archival reference tool rather than as a source for the newest information from the field; in short, over 80% of the respondents reported their most common use of the JOE was to skim the contents and file it for future use. Respondents were, however, relatively satisfied with the printed publication as over half rated their level of satisfaction with different elements of the printed copy as either satisfied or very satisfied, though they indicated greater satisfaction with the format than with the content.

The printed copy survey also offered an opportunity to learn from a representative sample of Extension staff□ some information that would be useful in determining their technical capabilities and abilities for accessing and using an electronically delivered publication as well as their work habits. Seventy-eight percent (309 of 395 respondents) reported a computer was located in their work environment for individual use. Of this number, 75% reported use of the computer for communication purposes including e-mail and Internet, but only 39% reported use of the computer to access databases such as Dialog or Compuserve. Eighty-three per cent of the respondents who do not use data bases indicated that their computer was not connected to a communications network. Twenty-eight percent reported they did not know how to use their computer for communications purposes, while an additional 25% reported there was some other reason for not using their computer for communication purposes or database access.

Twenty-six percent of the sample reported they share a computer with others in the work environment. Of this group, 70% reported the shared computer was used for e-mail and other communication purposes. Similarly, this group reported that their computers were not connected to a communications network and thus not available to access databases, a necessity for full utilization of the electronic JOE.

Pilot States Survey

Most returns were from field agents (69%), with the remaining returns scattered among administrative, other, and campus personnel categories. Most of the respondents have their own personal computer at their desk (74%) with most of the other respondents sharing a computer with other staff in their office.

The responses to questions related to knowledge and use of email, Internet, and Almanac were combined in a scalar measure and responses indicate that over half had generally positive attitudes toward the use of telecommunications; a positive relationship also exists between attitudes toward telecommunications use and satisfaction with the electronic Journal.

Thirty-one per cent indicated they (personally) had never retrieved their e-mail, while the same proportion had done so a few times per day; 33% had never sent an email message themselves, while 25% send messages themselves a few times each day. The survey responses indicated that it is likely email is handled in the same manner as postal mail in office operations; in other words, if an office secretary is expected to open postal mail and distribute it to office member then email is handled in the same fashion, especially if the office shares a computer among the staff. This practice would defeat the purpose of email communications which is direct, personal, timely communications.

For 57% of the respondents, the state Extension office pays their email costs (phone) with the county Extension budget paying these costs for 25%. This situation parallels that found in the survey of printed copy subscribers as many of those subscriptions are paid for by the state organization and distributed in bulk to staff. These practices likely contribute to the feeling among respondents that they do not want to pay for their subscription.

Thirty-nine per cent of the respondents had personally accessed the electronic JOE since January 1993. This percentage was smaller than expected, especially since responses indicated most people had been merely curious when they tried to access the electronic JOE. This curiosity factor may, however, help the enterprise in the long run as users spend more time browsing the contents of the JOE to satisfy their curiosity and better acquaint themselves with the material contained therein.

Nearly all the respondents indicated they had not accessed the electronic JOE archive (91%). This was a surprise since the earlier study of printed copy users indicated this was a common use pattern. The only explanation available is that, since the archive did not become available until summer, most respondents surveyed had not taken time prior to receiving the survey in October to use the archive. With the archive now available in a Gopher version which permits online browsing and retrieval future studies of subscriber usage should indicate a high level of popularity for this feature.

For those who had accessed all or part of the electronic JOE, the average (summed) rating for the combined items was 3.4, between neutral and satisfied. This rating of satisfaction is lower than that for the printed copy (4.2), indicating improvements are needed in the electronic version. The inability of ASCII models for electronic communications to support graphics inhibits efforts to increase satisfaction with the visual appearance. Most respondents did not have an opinion about the future format for the electronic version (57%). Of those who did, slightly more (23%) indicated the format should be one more suitable for electronic journaling rather than an exact duplication of the printed Journal (20%).

Perhaps the most important conclusion reached from these data is that there is a strong positive relationship between attitudes toward using electronic communications tools in Extension work and satisfaction with the electronic JOE. While the method used to determine this relationship could be refined considerably, the implication for future development is that leadership will be necessary to demonstrate the broader benefits of using this new tool in order to change attitudes. Training will also be necessary to make staff more adept in finding and retrieving information useful to the primary tasks addressed by staff. Finally, greater access to equipment suitable for electronic communications use will likely improve acceptance of the electronic JOE just as it does for other resources available from Internet sources.

Survey of Self-Subscribers

This aspect of the research is interesting because the unexpectedly high number of self-subscribers (600) suggests a market opportunity exists to expand JOE readership and CES visibility. The evaluation research team started with the hypothesis that, because they initiated the subscription from announcements made available on a small number of Internet listservers, this group would be more capable of retrieving information from electronic sources, have a more positive attitude toward this form of communications, and have a broader base of experience upon which to base their satisfaction judgments than other groups sampled. As indicated below, this hypothesis was generally supported by the findings.

Based on the Internet address extensions, the self-subscriber population was divided into two strata: those in institutions of higher education (.edu extensions) and those in other settings (e.g., .gov, .com, .org), including international addresses. Two-thirds of the population was in the .edu strata; a 25% random sample was drawn from this group. The entire population in the second strata was included in the survey (about 200 addresses). Interestingly, immediate partial confirmation of our hypothesis was obtained as over 75% of those sampled returned their instruments via email as compared to only 24% of the respondents in the pilot states sample.

A slightly higher percentage of the respondents were in the non-.edu strata (61%). It is reasonable to conclude that those sampled in higher education felt they were not interested in responding to this survey. In fact, over 70% of the respondents in higher education were employed by CES and not located in one of the pilot state institutions.

For the total sample, respondents age averaged 45 years, a result comparable to that in the other surveys completed. Most had graduate degrees (67%) and 35% indicated they subscribed to other electronic journals. In fact, 77% of those who subscribed to other electronic journals were in non-.edu settings indicating a substantial potential market outside higher education for the electronic JOE. Respondents in this study were even less likely to support a subscription fee for the JOE as 63% responded either strongly oppose fee or oppose fee on a five-point response scale. Additionally, of those who said they subscribed to another electronic journal, only 5% indicated they were paying a subscription fee. This information should warn others considering electronic journals that paid subscriptions are likely to be a very hard sell among Internet users.

Responses indicate that about 55% of the self-subscribers were Satisfied or Very satisfied. However, for the 44 respondents who said they had accessed more than one issue of the JOE, 66% were satisfied/very satisfied. For the 38% who had accessed only one issue of the JOE, only 48% said they were satisfied. This data indicates that those who accessed the JOE more frequently are more likely to be satisfied with the product. One way to interpret this information is that, as subscribers become more accustomed to the access procedures and appearance and content of the product (JOE), their expectations either change or become more settled; that is, they may adjust their expectations to what the product is rather than what the product could be). If accurate, this interpretation would indicate that future changes will mean periods of adjustment in expectations and feelings of satisfaction regarding the electronic Journal.

For the respondents employed in CES, the number of issues accessed also makes a difference in how satisfied they are with the electronic JOE. This is not the case for the non-CES group. Furthermore, the CES group is more satisfied with the JOE (77%) compared to the non-CES group (61%) if they have accessed more than one issue. Since this group is the primary audience for the JOE, satisfying them is important. It is also important to keep in mind, however, that the non-CES group, who appears to be more discriminating when it comes to rating satisfaction with the JOE, comprises a part of the electronic JOE market, and capturing more of them may be an important opportunity.

Respondents who subscribe to other electronic journals were asked how satisfied they are with the other electronic journal that they named, using the same rating scale as the one used to rate satisfaction with the JOE. Of this group, 83% are satisfied/very satisfied, indicating these respondents rated satisfaction higher for this other named e-journal than they rated satisfaction with the JOE. In other words, self-subscribers suggest the electronic Journal of Extension needs to make some improvements in order to meet standards being set by others.

For marketing purposes, the JOE Board of Directors is likely interested in why self-subscribers were interested in the electronic JOE. There may be several reasons for an individual to subscribe, including: 1) a broad interest in technology, 2) an interest in e-journaling, 3) an interest in the JOE itself, or 4) "coercion," (asked to subscribe by other(s). The idea for determining these influences developed from the research previously done for the readership and the pilot states using respondent comments. A set of items were developed to measure these hypotheses, using a Likert-type scale for responses. Category means were calculated for the total sample and for strata, and t-tests of significance were computed. The results of this analysis are presented in Table 1.

Table 1. Mean scores for influence items, total sample and strata

Response Categories	Total Sample	.edu	non-.edu
curiosity	3.4	3.3	3.5
someone asked me to	1.2	1.3	1.1
Subscribe to lots of e-journals	1.8	1.5*	2.0*
Need access to content in work	2.4	2.4	2.4
Don't have to wait for mailed copy	2.2	2.3	2.2
Will have to subscribe sometime	1.3	1.4	1.2
Am interested in new technology	3.8	3.9	3.7
Am an Internet surfer	2.6	2.5	2.6
Am wild about JOE in any format	1.6	1.6	1.7

*p< .01

The results appear to say more about what was not found with regard to factors influencing respondents to subscribe. Furthermore, T-tests of significance between items for the two strata showed only item ("Subscribe to lots of e-journals") has statistical significance. Summarizing the other findings, two items, "I'm curious about the electronic format of the JOE," and "I'm interested in new technology," rated high in terms of their influence upon respondents subscribing to the JOE. It appears likely that self-subscribers have a general interest in technology and electronic journal experiments.

Conclusions

This research information supported a decision by the Board of Directors for the JOE to discontinue printing the Journal and distributing paper copy, and to move to full electronic operations in 1994. The findings also assisted in the Board's planning to make this decision a success in several ways. At present the implementation of the plan is underway and the first issue of the JOE will be published electronically for all subscribers in April, 1994.

The research findings indicated that possible revenues from subscription fees would not be sufficient to cover the cost of the electronic Journal (or continuing the printed copy for that matter). Even though CES staff felt very strongly that it was important to maintain the JOE as a vehicle representing extension programs, they were generally unwilling to pay a subscription fee. The same feeling was expressed by non-CES respondents in the self-subscriber survey. Therefore, it was important that the Board devise a plan for identifying a financial support strategy which did not depend on subscription fees.

Interestingly, there was very little evidence that one concern of the Board, namely that an electronic publication would represent shifting the costs for a subscriber to obtain a printed copy to the subscriber as a direct cost, would be perceived as substantial enough to warrant opposition to the change in formats. In fact, there was very little information provided that would indicate that the costs of access (via telephone lines) or the costs of printing copies, was considered a barrier to the success of the electronic JOE.

The findings indicate that the electronic JOE publication will face some initial opposition on the part of a small minority of CES staff who are not in favor of electronic publication. In addition, early use of the electronic version is expected to be small because of the importance of upgrading hardware, access to the Internet, and staff knowledge and skills related to the use of electronic telecommunications in extension programs. Based on the pilot states study, the JOE Board can expect that a minority of CES staff will be slow to use the electronic Journal because of an underlying general attitude about the use of electronic communications in CES work. More importantly, there will be a small amount of use because of the lack of direct access to the Internet which prohibits full utilization of all its current, much less future, features (e.g., interactive Gopher searches, etc.). This is both a hardware problem and a staff capacity problem that current plans will have to accommodate. Fortunately for the JOE, the CES system has plans for utilizing this technology that will encourage the necessary changes that extend to more applications that electronic journaling. Since satisfaction with the electronic JOE is closely tied to attitudes about electronic communications, this will be an important aspect of future organizational effort.

Finally, the research has identified a potential new audience of peoples included articles about organizational issues faced by this publicly funded organization. The visual format was also changed to feature a two-column presentation with greater attention to graphics and photos. Thus, the decision to test an electronic format was very likely to confront a set of strongly-held expectations regarding content and format (appearance) existing for over 10,000 subscribers.

Nevertheless, the Board did not feel it could continue to financially support the JOE in its current form. Publication costs had more than doubled since 1982. The indirect costs, which had been assumed by various institutions in the past, were also being converted into direct costs as host institutions found their budgets constrained. An additional factor was the pressure from one of the cooperating agencies in the federal government, the U.S. Department of Agriculture, Extension Service. For several years, staff in USDA had been aggressively seeking different ways of demonstrating the potential of electronic telecommunications to increase the effectiveness of CES program activities and an electronically-published JOE was seen as an attractive addition to this strategy. In support of the feasibility test approved by the Journal Board, ES/USDA contributed a significant sum of money to support the technical process and the research designed to evaluate the results.

Research Design

The research element of the feasibility project was designed to solicit information from a variety of sources to support the more and more frequently today continuing professional education needs are being addressed using distance education methods. These distance education methods frequently utilize electronic telecommunications via satellite TV or telephone lines.

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Endnotes

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A complete description of the evaluation research design, procedures, and findings can be found in Extension Journal, Inc. (1994). The Electronic Journal of Extension: Going Online. Columbia, MO: Pigg, K.E. and Summers, J. C.

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Recently the authors received, via the Internet, a fully electronic and automated (via an artificial intelligence protocol) a survey from MIT being completed on behalf of the White House which is interested in the use of its electronic distribution of different kinds of information from President Clinton's office. The protocol is structured to deliver different sets of questions, in successive queries, based on responses to an initial set distributed electronically.

It is important to recognize that this part of the study provides a benchmark for comparisons with the electronic JOE users. This sample frame is essentially the total population of all CES staff in the U.S., and the results should accurately reflect the situation faced by the JOE Board in deciding whether or not to go electronic.

Price/Repman Model for Instructional Design for College-Level Courses Using Interactive Television

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The effectiveness of courses delivered over a distance, like face-to-face instruction, depends upon the planning of the course, class activities and the instructional materials used. The use of systematic instructional design (ID) in course planning can help to make any instruction more successful in promoting learning. However, there are significant differences between face-to-face instruction and distance learning. In this paper, applicable instructional design models are reviewed, the unique characteristics of distance education in higher education via interactive television (ITV) are discussed, and finally an instructional design model designed specifically for college course delivery via interactive television is presented.

Survey of Instructional Design Models

ID models represent the framework that is used to guide the entire process of designing instructional systems (Heinich, Molenda, and Russell 1989). Each of the ID models included here can aid in providing the framework necessary to plan effective instruction and activities. There are many other ID models. The ones described here are provided as representative samples.

Dick and Carey describe an ID model that includes nine stages:

(a) identify instructional goals
(b) conduct an instructional analysis
(c) identify entry behaviors and learner characteristics
(d) write performance objectives
(e) develop criterion-referenced test items
(f) develop an instructional strategy
(g) develop and select instructional materials
(h) design and conduct a formative evaluation with possible need for revision
(i) design and conduct a summative evaluation (Dick and Carey 1985)

The Alaska University suggests a four step ID model that includes design, development, evaluation, and revision (Alaska University 1989). The design stage begins by identifying the need for instruction, followed by audience analysis and specification of instructional goals. During the next stage (development), specific objectives are developed and integrated into the content outline. Existing materials are reviewed, content is organized, and any new instructional materials are developed or selected. Developing an evaluation strategy is a key component of the evaluation phase. The strategy should include a review of goals and objectives and methods for collecting and evaluating data. Based on this analysis, recommended revisions are incorporated into a revised instructional plan during the revision stage. Heinich, Molenda, and Russell provide the ASSURE model for instructional design. Moller (1991) applies this model to the planning of programs that use distance education. It is primarily used by the individual instructor for planning daily classroom use of media (Heinich, Molenda, and Russel 1985). The ASSURE model has six steps:

1 Analyze Learners
2 State Objectives
3 Select Media and Materials
4 Utilize Materials

5 Require Learner Performance
6 Evaluate and Revise

Haynes and Dillon apply an instructional system design (ISD) model that can help design instruction consisting of several interrelated activities. The six steps in this model are:

(a) the analysis of learner characteristics
(b) the determination of instructional objectives
(c) the selection of strategies
(d) the design of media
(e) the implementation of instruction
(f) the evaluation of the outcomes linked to the specific objectives and strategies (Haynes and Dillon \1992)

While these ID models employ the principles of systematic planning, they are general in nature. The unique characteristics of distance education courses suggest the adaptation of these models to the unique environment of ITV course delivery. These characteristics are discussed in the following section of this paper.

Characteristics of Distance Education

An understanding of the characteristics unique to the distance education environment will aid the design and planning processes. Keegan identifies five characteristics of the distance education environment (Keegan 1990). Included are the quasi-permanent separation of teacher and learner throughout the length of the learning process; the influence of an educational organization both in the planning and preparation of learning materials and in the provision of student support services; the pervasive use of media - print, audio, video, or computer - to unite teacher and learner and carry out the content of the course; the provision of two-way communication; and the quasi-permanent absence of the learning group throughout the length of the learning process. (Keegan 1990, 44) according to an Office of Technology Assessment study, "Students, teachers, course material and presentation, and interaction are all affected; distance learning creates a new context within which the education process and student-teacher interaction take place. Old styles of teaching and learning may not be most appropriate or effective when mediated by telecommunications technologies...In designing distance courses or modules, teachers and instructional designers have had to find ways to restructure interactivity." (Office of - Technology Assessment 1989, 93)

The Texas Education Agency states that "because of the intercession of distance and devices between the teacher and the student, new instructional techniques, varied uses of material and modification of class management may be appropriate." (Texas Education Agency 1987, 5) The consideration of these characteristics during the design and planning stages will help the educator or instructional designer plan for the unique opportunities made available with the DE communication technology being used to deliver instruction.

Adapting ID Models to Course Delivery Via ITV

Parker and Monson contend that specific techniques should be incorporated into the course Development process. The techniques include humanizing, participation, message style and feedback. Humanizing refers to the creation of an accepting environment which breaks down the barrier of distance and generates feelings of rapport between teacher and students. Participation deals with the extent of interaction among participants in the interactive situation. Message style refers to ways of enhancing the interest and appeal of a presentation. Planning for short instructional segments, varying tone of voice and volume, and supplementing programs with visual aids maintain the interest and attention of the students. Feedback allows instructors to determine if their presentations were clear and effective. Both verbal and written feedback should be obtained, and can include questionnaires, interviews, or group reports." (Moore & Thompson 1990, 21)

Allen and Carl list seven characteristics necessary for the creation of a successful distance learning program (Allen and Carl 1988). This model was adapted from guidelines found in the publication, Guide to Distance Learning as an Alternative Delivery Procedure published by the Texas Education Agency. The characteristics include:.

1 high standards are established for their teachers and mediators (student site contact persons; -also called proctors, monitors, aides, etc.)
2 consistently train and retrain staff
3 carefully evaluate teaching sessions and/or the course packages before distribution by telecommunication or other means
4 provide for easy communications between students, instructors and proctors
5 develop rigorous and valid testing programs which provide rapid response times and feedback
6 package the course content
7 provide ready accessibility to resources such as mediators and ample audiovisuals, print and other media for student use. (Texas Education Agency, 1987, pp. 4-5)

Wilson concludes that students learn when all of the above conditions are considered and the following provisions, which are more specific to distance education, are also included:

(a) Self-pacing is allowed
(b) Feedback is in the "fastest turn-around time that is feasible"
(c) Interaction with the institution is friendly and non threatening
(d) Curriculum is structured to guide the student Tin linking instruction with previous knowledge and interests
(e) They are self- motivated.(Wilson 1991, 42)

The transfer of instruction via ITV should be done in a manner that is effective and efficient in providing for the learners' needs, and it should use all available resources to achieve this goal. The use of certain teaching methods can aid in the teaching/learning process. Heinich, Molenda and Russell include eight methods to deliver the instructional message (Heinich, Molenda and Russell 1989). They are presentation, demonstration, drill-and practice, tutorial, gaming, simulation, discovery, and problem solving. Determining which model or method is best depends on the learners involved and the content of the lesson. Information concerning learner characteristics and learning styles is therefore important in planning and delivering instruction via ITV. The preparation and delivery of instructional lessons to the distant learner involves understanding the learner's previously acquired knowledge and learning capabilities. Lessons should be prepared to meet the knowledge levels of the learners and provide the best method to transfer important information to them. In targeting the adult learner, Knowles's andragogical Model makes the following assumptions:

(a) Self-concept moves from one of dependent personality to self-directed human being
(b) Adults accumulate a growing reservoir of experience that becomes a rich source of learning
(c) Readiness to learn becomes increasingly oriented to their developmental tasks of their social roles
(d) Shift in immediate application as their orientation of learning shifts from subject centeredness to performance centeredness. (Wilson 1991, 42)

An Instructional Design Model for Course Development via ITV

Drawing on what we have learned from general instructional design models, the unique characteristics of distance education, and several years of experience with teaching college courses via ITV, we have developed an instructional design model for courses delivered via ITV. Important considerations incorporated into our model include the delivery system, available resources, course content, the target learner audience, and student learning styles. Clearly, designing any ITV course can be a complex, time consuming task. There are many pieces to fit together during the planning process that aid in the development of course production. However, to be practical in terms of planning and development time as well as cost effectiveness, ITV courses must be planned and conducted with resources similar to what is afforded traditional campus-based courses.

Based on the literature and our own experience with distance education via interactive television, we suggest the following nine step model for designers of college level ITV courses:

1. Identify Course Goals
2. Analyze and Organize Content
3. Write Performance Objectives
4. Identify Learner Characteristics
5. Develop Lesson Plans
6. Develop and Select Instructional Materials ,
7. Design and Conduct Formative Evaluation
8. Conduct Instruction and Modify Instructional Plan ,
9. Design and Conduct Summative Evaluation

This model is an adaptation of the Dick and Carey model discussed previously. It is based on the unique characteristics of distance learning via ITV and our own research. We think that it is well suited to the delivery of graduate level courses and takes into consideration the mature learner. It is well suited to situations which do not have large support staffs and budgets for ITV. The model is implemented as follows:

The Planning Team

The purpose of the planning team is to structure academic content in a form suitable for study by distant learners (Moore, et al 1990). Instructional experiences can be carefully designed and developed so that they can be used by a wide variety of learners possessing similar learner-related characteristics (Dwyer 1990). The course planning process can involve many people who are specialists in certain fields. Members of such a planning team might include subject authors, instructional technologists, illustrators, media specialists, librarians, photo-librarians, and editors (Moore, et al 1990). Brinkley, Pavlechko & Thompson suggest a design team consisting of the course instructor, an instructional designer, a producer/director, a graphic artist and an on-air director (Brinkley, Pavlechko and Thompson 1991). However, the individual instructor may be the entire planning team and will provide the necessary course content to be edited and published for an ITV course. A realistic planning team for a typical ITV course might consist of the instructor, an instructional technologist (instructional designer), and a student or potential student of the course. Development of course content can begin by representing it in a manner that enables the planning team to develop a "course description, general aims, instructional goals, units And lessons/ modules to drive the content." (Brinkley, Pavlechko & Thompson 1991, 51)

Course Design

Identify Instructional Goals

Goals are the broad statements of expected outcomes for the course. Identification of the instructional goals is primarily the responsibility of the course instructor. If the course is designed to meet a specific purpose (e.g., certification or degree requirements) the basic content of the course may be predetermined. The goal statements will therefore reflect this. Usually, courses taught via ITV are also taught in traditional campus classrooms. The goals of the ITV course should be basically the same as campus-based courses. We have offered an introductory course in computer applications for educators both on campus and via ITV. Some sample goals for this course are as follows: Demonstrate an understanding of basic computer terminology, hardware and software both as (a) classroom and personal productivity tool, (b) evaluate, select and recommend educational software and apply appropriate instructional design In order to integrate the use of small computers into specific content areas. Explore developmental issues related to the creation of appropriate instructional software. These goals appear on the course syllabus for both the regular on-campus classes and ITV classes.

Conduct Content Analysis

The teacher is a content specialist and therefore will be knowledgeable concerning the content of the course. Texts, accreditation association guidelines, and state curriculum guides may also be helpful. We divide the course into logical segments representing one class each and begin to develop a lesson plan for each class. The topics and content outline for each class are specified first. The instructional time for any college course must meet the minimum requirements of the college/university and the accreditation agency, usually 35-40 hours each for a 3 credit hour course. However, allocation of class time may be different for ITV course than for on-campus courses. Some courses will require guided practice at remote sites, which are not part of televised Lessons. This may be scheduled as a laboratory or may be conducted as part of regular instructional time.

Write Performance Objectives

Measurable objectives are written for each lesson. These are taken from the goal statements and are stated in terms of observable student behaviors. Measurable objectives help clarify exactly what is expected in the minds of both the teachers and the learners. Techniques of stating performance objectives are beyond the scope of this paper. A set of objectives for a lesson on integrated software for our educational computing course follows is given here as a sample: Topic: Introduction to Integrated Software Objectives: Students will be able to: 1) Define integrated software; 2) List several examples of integrated software packages, 3) List examples of computer applications which are frequently included in integrated software, 4) List examples of products which may be produced with integrated software, 5) Discuss the relative advantages and limitations of integrated software packages as compared with stand-alone software.

If the teacher is not an instructional designer, the technologist should assist the course instructor in stating performance objectives for each class. The student member of the planning team can be asked to review the evolving lesson plans for suggestions. Clarity of goals and objective statements, terminology used, and suggestions concerning content to be included can be reviewed.

Identify Learner Characteristics

There are many ways to identify learner characteristics. We gather information at the first class meeting. This begins with introductions and completion of a brief student profile form which includes such information as student's major course of study, reason for taking the course, previous experience relevant to the course, and place of employment. We also use both the Canfield Learning Styles Inventory and a teacher-made pre-test which is given at the first class meeting. The Canfield LIS measures the conditions of learning, the content of learning, the mode of learning, and student expectations in a learning situation (Boyd & Kerstiens 1989). The instrument measures these categories through thirty items in which the students are asked to rank in order their preferences among four choices. According to Boylan & Kerstiens, the Canfield LSI includes several specific elements associated with the four dimensions mentioned (Boylan & Kerstiens 1989). Under the category of conditions of learning these student preferences are measured:

1. Affiliation - pleasant, friendly, and warm relations with other students or faculty;
2. Structure - orderly, logical, and well-defined goals, objectives, and study plans;
3. Achievement - independence, self-determined goals and objectives in relation to perceived skills and interests; and
4. Eminence - competition, knowledge of one's own performance in relation to (other's, need for control or authority.

Under the category of Content, the instrument measures student preferences for working with various sorts of content. These content sub-categories include: numerical, qualitative, (working with words or language), inanimate (working with things), and working with people. Canfield agrees with Gagne's notion of "Channel efficiency," the idea that in every individual, some channels of perceiving and processing information are more efficient than others. As a result, his instrument also measures students' preferred mode of learning. The categories under this heading are: listening, reading, iconics (learning through illustrations, movies, slides, graphs, and pictures, etc.), and direct experience (Canfield 1967).

Finally, the Canfield LSI assesses student expectations of learning - i.e., their anticipated level of performance. The levels of anticipation include outstanding or superior performance, good or above-average performance, average or satisfactory performance, and below-average or unsatisfactory performance. Researchers have classified individual learners as Field Independent (FI) or Field Dependent (FD). FI learners are those who prefer "solitary situations and self-defined goals, strategies and reinforcement." (Canfield 1967, 43) FD learners are those who prefer "group situations, externally defined goals and reinforcement, and explicit instructions or definitions."(ibid.) The literature indicates that the FI learner is more likely to succeed at distance education (Wilson 1991). Applying interactive television in a manner that provides learning opportunities for both FI and FD learners, will ensure that methods that are suitable for both groups are included.

Identifying learner characteristics and the determination of learners' learning styles will help the instructor determine what instructional style(s) and delivery method(s) to implement. Course content can be delivered so that the students' academic success is high. Although existing research in distance education is inconclusive concerning the effect of learning style preferences on achievement, course design and assessment will play a critical role in determining what learning styles are best suited for the information and instruction delivered via interactive television technology.

The course pre-test provides information about how much the student already knows about the course goals and objectives. Since we deal with mature learners, we often ask for self-assessment. The information from these instruments is promptly sent to the instructor by FAX or data communications. The data is analyzed and detail is added to the lesson plans based on the information. For example, if most of the students are found to be field-independent learners, more activities which provide for independent study may be included in the course. Student profile cards are also made which are referred to by the instructor as the course progresses. We use these to try to make assignments relevant to the student's interests, level of knowledge, and learning style.

Develop Lesson Plans

The basic instructional plan is the syllabus which is prepared first. However, the details of the instructional plan are contained in the lesson plans. The framework of each lesson plan was established in the content analysis and writing of performance objectives for each lesson. Now it is time to add detail to each lesson. With knowledge of the learners, the objectives and topics can be adjusted. Relevant examples can be developed. Activities can be planned. Requirements for media and materials can be determined. The technologist works with the teacher to plan activities which work best with the ITV medium. Lesson plans will be fully developed as the course is conducted. However, it is important to have long range plans. In addition to the basic need for good planning, the ITV staff will need to know what to expect and production of materials must be done in advance. We try to have final plans ready at least two weeks in advance of each class. .

Develop and Select Instructional Materials

Earlier it was pointed out that ITV is an inherently visual medium. If a traditional lecture is poor technique in a regular class, it is deadly on ITV. Visuals, video demonstrations, and commercial media can be used to present the content in a manner which is more likely to maintain the student's attention and help them understand and retain the information. Specifications for the media are developed in the instructional plan. Frequently, the teacher produces the media or the campus media service, ITV staff, or students may help.

Design and Conduct Formative Evaluation

As the course progresses, frequent feedback is obtained both informally and formally. Question and answer sessions are held during each class. Brief quizzes are given and student assignments are collected regularly. We specifically try to determine which methods and materials are preferred and to what degree objectives are being mastered.

Conduct Instruction and Modify Instructional Plan

Modifications to the lesson plans are made as the course progresses based on feedback from the students. The student member of the planning team is also frequently used as a sounding board and to make suggestions. Material that was not mastered may be clarified by presenting it in another manner. Sometimes, new timely topics are added.

Design and Conduct Summative Evaluation

At the conclusion of the course, a post-test and a course evaluation are administered. The post-test is either the same as the pre-test or a more detailed version of it and provides detailed information concerning how well each objective was mastered. The course evaluation that we use is a standard course evaluation used at Texas Tech to which we have added several items concerning delivery of the course via ITV. This information is useful in evaluating the success of the course and for providing information for the next time the course is offered. The course planning team reviews and evaluates the data and makes recommendations for future courses. "

Summary and Conclusion

College-level course delivery via ITV is an exciting and growing phenomenon. However, the unique characteristics of ITV and distance education necessitate careful planning in order for the courses to be effective. The use of the instructional design model presented here or other systematic approaches to ID in course planning can help to make instruction more successful in promoting learning.

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"Nifti" Workforce Training Strategies

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Introduction

The need to accelerate skill development of the North American workforce to meet global challenges is a common theme in education, industry, and government circles (Cohen, 1991; Human Resources, 1992; Kimmerling, 1992; Porter, 1991; Prosperity Secretariat, 1991). Canada has not adapted smoothly to global change as evidenced by the decline in Canadian's real income since 1970s. A study by the Prosperity Secretariat (1991) cites a major factor in that decline as reduced manufacturing efficiency. The Secretariat links inadequate training and accelerating technological change to the erosion of Canadian productivity and income. In a study of the Canadian economy in this competitive age, Porter (1991) identifies Canada's relatively sheltered economic background as another factor inhibiting our responsiveness to global change.

Like the Secretariat, Porter links economic health to workforce development stating that ongoing upgrading is a key to economic recovery. He notes, however, there is little evidence of such upgrading in Canadian industry.

Skill Development and the Forest Industry

In Canada, and especially in British Columbia, the forest industry is a key factor in the economic climate. Canada grows 14% of the worlds' softwood, half of that in British Columbia. In Canada one of ten jobs is directly related to the forest industry and in British Columbia that proportion increases to 16.3% of the population (Council of Forest Industries, 1993).

Over the previous years, the forest industry has, as described by the Western Wood Products Forum, experienced "...a painful and challenging period of transition which will transform it permanently" (Human Resources, 1992, p. 1). In British Columbia, the historically lucrative industry experienced a net loss of $262 million in 1992 (Council of Forest Industries, 1993). The Western Wood Products Forum (a joint venture including major wood products companies and the IWA-Canada, an industry union) was organized in 1992 to look at impact of change on human resource dimension of the forest industry.

The Forum found that in addition to accelerating global competitiveness, Canadian forest workers are impacted by technology which is increasing efficiency and reducing traditional unskilled jobs. Remaining older workers must be retrained to deal with the ongoing changes in their workplace. Such changes are not unique to the forest industry. Fortunately, training implications of these changes are beginning to receive attention. Training trends in the United States show a general increase in training opportunities for production workers (Lee, 1991).

Challenges to Forest Industry Training

The forest industry exemplifies the historical resource based foundation of Canada's economy. Traditionally, such industries have relied on natural rather than human resource development for continued prosperity (Porter, 1991). However, technological change and competition have significantly changed the skills needed to manufacture wood products. Despite dramatic production changes, training has not consistently accompanied technological advancements or client demands for more sophisticated or higher quality products. The recession has further undermined the willingness and ability of resource-based industries to train workers. One training professional from a forest company describes the dilemma well: "When times are good and money's coming in there's no time to train; when times are bad there's no money to train" (Peterson, 1993).

Although similar to other manufacturing sectors, forest companies also face several unique training challenges due to the nature of their work site. Mills are generally located away from urban centers and training providers. This means employers must pay travel and hotel costs when workers travel for training. Bringing trainers onsite is impractical due to the production nature of mills. Workers are needed to maintain ongoing production and, due to economic constraints, staff levels are minimal. They can also be working in any of four shifts further reducing available trainees and increasing scheduling complexity.

Despite the costly and cumbersome nature of training in regional mills, companies recognize they must have skilled employees to stay in business. As the industry accepts this need, companies are seeking cost effective and efficient training strategies. This paper outlines an innovative approach sawmills in one geographic area of British Columbia are using to address their training needs and challenges.

The Northern Interior Forest Training Initiative - "Sectoral" Training

The Northern Interior Forest Training Initiative (NIFTI) was organized in 1991 as a partnership vehicle to help forest companies identify and access training collaboratively. In economic development and training studies, collaboration among educational institutions, industry, and government is considered a key factor in addressing training needs appropriately (Lemke & Wismer, n.d; Human resources, 1992; Porter, 1991; Prosperity Secretariat, 1991).

The NIFTI partnership includes forest companies, unions, and associations, educational providers, and the provincial and federal governments. The Open Learning Agency (OLA) is one of the educational partners in NIFTI. OLA is a provincial post secondary educational institution that provides workplace, college, and university education in a variety of nontraditional approaches. A training consultant from the Workplace Training Systems department of OLA provides project coordination and conducts training-related processes like needs assessment and course coordination. The training consultant works closely with industry and union representatives who are key industry liaisons.

NIFTI Trades Upgrade

In May, 1993, NIFTI began exploring a need identified by a major forest company for upgrading its sawmill tradespeople, especially the millwrights and electricians. The company realized its production levels did not match its investments in technology. The company also realized it would not be able to independently upgrade its tradespeople due to previously described geographic and work place factors. A NIFTI project team was organized to explore interest in other mills for upgrading trades people. Initially the project team met with three mills. Within two months over fourteen mills wanted to be involved. Organization on a major regional Trades Upgrade began.

The common problem sawmills shared was that while installing the latest production technology, companies overlooked ensuring that skills of tradespeople maintaining the technology were appropriately upgraded. To increase technical skill levels of sawmill electricians and millwrights throughout the region, NIFTI undertook to identify major skill gaps, organize appropriate training, and ensure that training delivery was appropriate to a dispersed, production-based workforce.

Methodology

Three stages of collaborative program development were involved in NIFTI's Trades Upgrade project: needs identification, program planning, and training delivery.

Union and management cooperation was critical in the project because of the union structure in most companies. Accordingly, the NIFTI project team consisted of a union president, an industry manager of recruitment and training, and the OLA training consultant who coordinates NIFTI. The team traveled throughout the region meeting with trades people to gather information through focus groups. A key organizational principle of the process was involving key stakeholders in the needs assessment process so they would feel the resulting training reflected their situations.

Focus groups were conducted at four mills in a geographic radius of 500 kilometers. Tradespeople from six mills were involved in the focus groups. This approach was selected for two reasons. As Kreuger (1988) discusses, focus groups enable researchers to meet repeatedly with similar participants "to identify trends and patterns in perceptions (p. 18)." Another important factor for the Trades Upgrade was personal interaction with the trades people to build support for the training which would follow. Repeatedly, participants expressed appreciation for being asked their opinions.

"Trends and patterns" were consistent throughout the focus groups. At each mill, supervisors or superintendents reviewed the focus group data from the management perspective. In addition to identifying training needs, trades people also made recommendations about delivery.

Trades Upgrade "Roadmaps"

Information from focus group discussions was organized into a skills list called a Trade Skills Roadmap for each trade. The Roadmap included broad skill categories and more detailed "sub" skills. Results were based on the "gap" concept - the difference between the ideal skill and current skill levels. For each skill, respondents choose from two 5-point Likert scales (1= low to 5=high). First they identified their current skill level; then they identified the importance of that skill to their job.

Tradespeople reviewed the Roadmaps for content validity. After pilot testing at a local mill, the Roadmaps were distributed by courier throughout a 700 kilometer radius in the Northern Interior. Instruction sheets were provided with the Roadmaps informing participants about the Trade Upgrade's development and purpose, and about completing the Roadmap. Participation was voluntary. A mill contact distributed and collected the Roadmaps then sent them to the NIFTI coordinator for analysis.

Results

Two hundred and fifteen millwrights and 100 electricians from 21 mills completed the Trades Upgrade Roadmaps. Responses were analyzed using a Minitab data analysis program and results were reported for individual companies, the regions and the overall sawmill sector. Skill gaps exceeding 1.5 on a 5-point scale were highlighted in the reports and were the basis of training recommendations. Standard deviation exceeding 1.5 was also reported so that mills could be alerted to widely divergent responses. Those differences would be reviewed by mill personnel to determine if the differences resulted from variations in skill levels or inconsistent priorities.

The ten largest skill gaps for each trade were targeted for training delivery. The two major training gaps for all the mills reflected the technological developments in the industry: hydraulics for millwrights and programmable logic controllers (PLC) for electricians. (PLCs are computers that run production equipment).

Planning and Delivery

Planning for the Trades Upgrade content and delivery was also based on consistent stockholder involvement. Representatives from mills throughout the region met three times in a large group, the Industry Advisory Group (IAG), to discuss findings, select a training provider, clarify content, and coordinate delivery. These members later met locally to finalize the distribution of training seats in their area. The Industry Advisors acted as ongoing communication links between the project team, company management, and tradespeople.

Two delivery methods were selected for the Trades Upgrade: interactive video instruction (IVI) and "hands on" training delivered locally by a mobile training unit. On site IVI was selected to provide tradespeople with an introduction or review of basic theory. This part of the training would build a common level of understanding prior to instructor led training which would reinforce, apply, and advance existing knowledge and skills. IVI combines full motion video with computer-based instruction. A regular computer unit is configured to support a laser disk player. Using minimal computer skills, trainees interact with the information at their own pace in the privacy and convenience of their own workplace.

The NIFTI project team located relevant IVI programs. These programs were tested by a mill and results presented at an Industry Advisory Group meeting. Members agreed to make the IVI programs the basic component of the training primarily due to positive "testimonials" of several mills who had used that delivery method. However, the logistical advantages of IVI delivery for a production-based workplace are obvious. The equipment can be moved onsite and trainees can access it at their convenience and work at their own pace.

Muller & Leonetti (1992) describe the advantages of IVI instruction as timely access, flexible training, effectiveness, relevance to multiple training paths, and scientifically validated and measurable effectiveness. Experiences of a variety of major organizations attest to the benefits of this technology in training; those organizations range from Federal Express (Wilson, 1991), Shell (Zemke, 1991), Caterpillar (Griffith, 1992) and the U.S. Navy (Smith, Halfen, & Wilburn, 1989).

The Industrial Mobile Training Unit of North Island College from Vancouver Island was selected to provide the skill-based instruction. Over three months, the mobile units would travel to four sites in the Northern Interior of British Columbia. Two types of units would be used. Hydraulics equipment would be transported to the mill by a North Island truck then set up in an onsite training area. The PLC equipment is in a self contained bus. Training is delivered right inside the PLC vehicle at each site. Maximum class size is ten for hydraulics and eight for PLCs. Units will stay in a site according to the number of trainees local companies have scheduled. Sites will have the units at least twice in the three month schedule. Training begins in late February and ends in early June to avoid conflict with holiday schedules.

Regions are taking advantage of the flexibility of training tailored to their needs. The on site training was organized as five day sessions in most sites. However, mills in one region are considering doing three day training sessions and having a six day week in hydraulics to try accommodate high trainee numbers. That region is also considering doing ten rather than five day PLC courses, adding an expanded advanced level session.

Implications

Through the Trades Upgrade, over 20 sawmills are working together in the Northern Interior of British Columbia to plan and access relevant, responsive trades training. During this first phase of the Trades Upgrade, approximately 200 trades people will have their skills upgraded. (The value of this process was emphasized in a discussion over coffee prior to the first class. A tradesperson said this hydraulics session would be his first training course since he completed his apprenticeship eighteen years ago).

Considering the dramatic technological changes over the past three decades, the scope of skill development needed in the industry is staggering. By working cooperatively, mills significantly reduce the cost of training, in some areas, making training possible for the first time in decades.

The potential cost savings to industry and tax payers through sectoral training approaches are also staggering. In other programs available to industry, the government subsidized the cost of training. In any training delivered by NIFTI, including the Trades Upgrade, mills are paying full cost of the training. An important benefit of sectoral training is the effect of "bulk" buying. Local training for the Trades Upgrade can be $2000 less per week than similar training offered by other providers.

From a workforce development perspective, through sectoral collaboration, NIFTI is implementing recommendations of major human resource studies in the province and echoed throughout the literature. For example, the British Columbia Task Force on Employment & Training (1991) identified ten human resource development goals. NIFTI is addressing the six goals which relate most closely to the workplace:

- improving access to education and training
- improving links between workplace needs and education and training
- increasing commitment of employees, employers and unions to skill development and lifelong learning
- increasing workplace training
- increasing co-ordination among those providing workplace training
- minimizing administrative costs of labor market programs.

Three major implications for industry and education professionals from the NIFTI experience are:

1. For workforce training to be effective, companies should be integrally and collaboratively involved throughout the needs assessment and program planning process.

2. Despite the traditional nature of an industry, companies will be eager to work with unfamiliar but responsive delivery methods. Therefore professionals in the training and education field need to be informed of nontraditional educational approaches that will be flexible and fit the needs of the work based learner.

3. Professionals and companies need to have access to technology-based resources to experience the benefits of alternative delivery methods, benefits that NIFTI has found increase industry's willingness to train workers.

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The Impact of an Interactive Text Book on Distance Learning Classes: An Assessment of Student Success and Attrition

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I. Statement of the Problem

North Harris College has offered distant learning courses in the department of sociology since spring semester of 1991. NHC (one of four colleges in the North Harris Montgomery Community College District) offers both a telecourse and an independent study course in sociology. Two concerns very quickly emerged concerning the distant learning courses; attrition and student success. The attrition rate in both the telecourse and independent study fluctuated between 50% to 65% while in the traditional sociology classes the attrition rate was between 20% to 30%. Grade distribution in the two distant learning courses had been consistently lower than grades in the traditional classroom setting. This paper addresses these two issues and discusses a program implemented at North Harris College in order to meet these two challenges.

The lack of course completion is not unique to North Harris College distance learning program. The attrition rate of NHC sociology distance learning courses is comparable with distance learning programs in other college systems. Feasley reports that "existing research indicates that students complete distance education courses less often (10 to 70 percent) than their counterparts finish classroom-based ones (50 to 85 percent)" (6). However, when students are carefully screened for certain characteristics such as a mature approach to education, early starters and independent workers, the student remains in the course and succeeded as well, if not better, than their traditional student counterpart (Boyd). North Harris College, like many other community college districts, does not screen students who enroll in these types of courses; North Harris College has experienced high attrition rates in the distance learning courses.

Not only was there a higher attrition rate in the distance learning courses, but student success, as measured by final course grade distribution, was lower than final course grade distribution in the NHC traditional sociology course. In the traditional classroom, grade distribution more closely approached a normal curve of approximately 10% As, 20% Bs., 40% Cs, 20% Ds and 10% Fs. This was not what was found in the distant learning courses. There had been semesters in which there were no As or very few As in distance learning classes..

The high attrition rate and relative lack of student success may be attributed to the passive learning style involved in traditional text books and distance learning format. Active learning incorporated into an interactive text book may offer help for these two challenges.

Active learning involves the student in the learning process. The student develops the ability to interact with the material through senses other than vision and the ability to apply and use the information in his/her own life. Active learning encompasses several components including talking and listening, writing, reading and reflecting. Learning strategies for active learning include small groups, cooperative work, case studies, simulations, discussion teaching, problem solving and journal writing. Teaching resources include readings, homework assignments, outside speakers, teaching technology, prepared educational materials and commercial and educational television (Meyers 20). These strategies and resources allow students to clarify, question, consolidate and appropriate new knowledge (Meyers 21). Some of these devices can be incorporated within a text book in order to facilitate active learning.

Klinger has shown that a distance learning course designed to include active learning strategies generally reserved for the traditional classroom facilitate distance learning students to develop problem-solving and decision-making skills. These skills promote success for the distance learning student (Klinger 87). The program that has been developed for the distance learning program at North Harris College is based around a text book which implements active learning theory into the text book itself. The text book, *Looking Through the Window of Sociology*[1], attempts to create a learning environment for the distance learning student by creatively restructuring the traditional text book. The text book is designed to include many active learning strategies. The active learning features in the interactive text book, *Looking Through the Window of Sociology*, include:

1. Placement and form of **Chapter Objectives**. Chapter objectives are stated as a series of questions at the beginning of each chapter. These questions assist student reading, generate thinking about the material before actually reading the material and provide a "hanger" for students to organize text material. According to Chaffee, questioning raises important issues and, through their answering of the questions, the student gains a knowledge of the "various reasons and evidence that support each of the different viewpoints involved" (56). These chapter objectives are also used throughout the chapter to introduce the text material.[2]
2. Placement of **Key Terms and Key People** at beginning of chapter rather than end of book or chapter of text book. Important concepts with definitions and theorists are placed right after the chapter objectives in order to give the student a hint of important people to note and to provide a basic understanding of sociological concepts before actually reading the material. With a basic understanding of concepts, the text material should be more readily understood.
3. Placement of knowledge check questions, **"Quick Glances,"** throughout the chapter. Mini quizzes are used throughout the chapters (utilizing margin spaces) in order to provide immediate feedback on retention of information. These are true-false quizzes given after small sections of text material. These mini quizzes are designed to impress the information in the student's mind; before information can be remembered, it must be "impressed clearly and crisply at least one" (Pauk 93). Furthermore, studies have shown that most freshman and sophomore college students have an attention span for textbook material of about five minutes (Gardner 81). The mini quizzes, if the student completes them, forces him/her to break the material into smaller segments and time periods.
4. Placement of critical thinking exercises entitled **"Thinking Sociology"** throughout the chapter. These are questions designed to help the student relate material to his/her own life experiences. When a student is involved with course content and can relate the material to his/her own life, a student can clarify and improve his/her understanding and thus improve retention of subject matter (Chaffee 27). Furthermore, application questions involves higher level thinking skills than definition recall.
5. Inclusion of a **Reading** for each chapter. A classical or current reading is utilized for each chapter in order to expose the student to supplementary information about the topic in the chapter. The student can gain "more specific ideas by analyzing the work of successful writers" (Chaffee 172). Since each reading is chosen for the chapter topic, the relevancy is easily observed by the student.
6. Inclusion of **Study Guide** within the textbook. A study guide is included in the text book. Each chapter study guide includes multiple choice, fill-in-the-blank and essay questions. Objective and subjective questions are designed to be used as

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[1] Dodgen, Lynda and Adrian Rapp. 1994. *Looking Through the Window of Sociology*. Dubuque, Iowa: Kendall/Hunt.

[2] This is based on the learning strategy called "SQ3R" (Robinson). The letters stand for "survey, question, read, recite, review."

sample tests to be completed after completion of the text book/telecourse material. The essay questions also serve to stimulate critical thinking about course material. Since the study guide is included as part of the text book, it is viewed as an integral part of the course requirements rather than as a "optional supplement."

7. Inclusion of chapter **Assignment**. A homework assignment is included for each chapter in order to integrate material and develop critical thinking skills through application and synthesis. These assignments are also designed to include material which was covered in previous chapter in order to help the student better integrate the material from chapter to chapter. The assignments are to be completed prior to taking the exams.
8. Utilization of **Journal Entry** for each chapter. A journal entry is included for each chapter to encourage the student to think about how text material relates to his/her own life. Both the Assignment and Journal Entry require that the student compose and write. Writing is a form of active learning which aids students in exploring their own thinking about concepts and issues, thereby expanding their mental structures (Meyers 24).
9. Placement of **Chapter Summary** at the end of each chapter. A chapter summary is found at the end of each chapter to provide an overview of "where the student has been." The chapter objectives let the student know "where he/she is going" and the summary provides an opportunity for reiteration and consolidation of text book material.

It is hypothesized that students who use the more interactive learning techniques developed through the text book entitled *Looking Through the Window of Sociology* will have a lower attrition rate and a higher success rate than those students using the more traditional text book.

II. Sample and Methodology

The interactive text book was introduced during fall of 1993. During the fall of 1992 and spring of 1993 a traditional text book was used in the classroom.[3] In order to see what impact the interactive text book had for the distance learning student, data was collected to 1) compare attrition and grades for traditional and distance learning students before the introduction of the interactive textbook (fall of 1992 and spring of 1993) and 2) to compare distance learners before and after the introduction of the interactive text book.

Data was collected from the official class records for the semesters of fall 1992, spring 1993 for both traditional and distance learning classes. Data was also collected on distance learning students for fall of 1993. The 308 traditional students were sampled from day and night sections. The distance learning classes included both telecourse and independent study classes. The sample for telecourse for fall 1992/spring 1993 was 72 students. The independent course sample for fall 1992/spring 1993 was 55 students. The sample for telecourse for fall 1993 (the semester in which the interactive text book was introduced) was 34; the sample for independent for fall 1993 was 41 students.

III. Results

The data collected from official class records supported the contention that students enrolled in distance learning have a higher attrition rate and a lower level of grade achievement than traditional principles of sociology classes. When a comparison was made for the "W" grade (withdrawal), 57% of the telecourse students and 64% of the independent study students did not complete the course: this was an average attrition rate of 60% of the students. The "W" rate for students enrolled in the traditional course was 22%.

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[3] Telecourse:

Kornblum, Willliam. 1991. *Sociology in a Changing World.* Chicago: Holt Rinehart and Winston.

Independent and traditional course:

Brinkerhoff, David and Lynn K. White. 1991. *Sociology.* New York: West.

The data on course success were not as conclusive as the figures for attrition. Fewer of the students in distance learning courses earned As than students in the traditional class room setting; approximately 6.5% of the distance learning students earned an A in contrast to 12% of those students in traditional classes earning an A. Fifteen percent of the students in the distance learning courses earned Bs; 20% of the traditional class room students earned Bs. Students in the traditional classroom setting did earn a higher proportion of the higher grades. Interestingly enough, the Ds and Fs showed a shift in the trend; 3% of the distance learning students earned a D in contrast to 12% of the traditional class room students. Fs exhibited the same reverse pattern; 7.5% of the distance learning students earned an F and 10% of the traditional class room students earned an F. In conclusion, those students in the distance learning classes earned fewer As and Bs than those students in traditional class room setting; the distance learning students also earned fewer Ds and Fs. Refer to the table "Comparison Chart of Final Grades and Attrition from Fall 1992 to Fall 1993 for Distance Learning and Traditional Classes."

With the introduction of the interactive sociology textbook in the fall of 1992, it was hoped that both student success and high attrition rates would be improved. The student withdrawal rate did drop after the introduction of *Looking Through the Window of Sociology*. Before the introduction of the text book, the withdrawal rate was 57% in the telecourse in the fall of 1992/spring of 1993 but in the fall of 1993, after the introduction of the text book, the drop rate was 50%; this was an improvement of 7%. An even more dramatic result emerged with the independent sociology course. In the fall of 1992/spring of 1993 the "W" rate was 64% but in the fall of 1993 the "W" grades had dropped to 46%. This was an improvement of successfully retaining another 18% of the students. The raising of the retention rate may have been greater for the independent course because the telecourse has more structure due to the weekly television programs. The interactive text book did, in fact, lower the attrition rate in the distance learning courses.

Grade distribution improved with the implementation of the interactive textbook. In the fall of 1992/spring of 1993, 10% of the telecourse and 3% of the independent students earned an A. During the first semester of the interactive text book, 15% of the telecourse and 15% of the independent students had an A. The same pattern continued with the Bs. With the traditional text book, 19% of the telecourse and 11% of the independent students earned a B. With the use of the interactive text book, 24% of the telecourse and 24% of the independent students earned a B. There was also a decrease in the number of Fs for the telecourse and independent students. In the fall of 1992/spring of 1993, 3% of the telecourse and 12% of the independent students earned an F. After the introduction of the interactive text book, none of the telecourse students earned an F and only 5% of the independent students earned an F. In conclusion, there was an improvement in grades with the use of the interactive text book. (Refer to table entitled "Comparison Chart of Final Grades and Attrition from Fall 1992 to Fall 1993 for Distance Learning and Traditional Classes.") Even though the weekly television videos provided the telecourse students with an additional mode of learning that the independent students did not have, nevertheless telecourse students experienced higher final grades and a lower attrition rate after the introduction of the interactive text book.

Comparison Chart of Final Grades and Attrition from Fall 1992 to Fall 1993 for Distance Learning and Traditional Classes

Grade	Tele Fall 92/ Spring 93	Indep Fall 92/ Spring 93	Traditional Fall 92/ Spring 93	Tele Fall 93	Indep Fall 93
A	10%	03%	12%	15%	15%
B	19%	11%	20%	24%	24%
C	11%	08%	23%	09%	10%
D	00%	03%	12%	03%	00%
F	03%	12%	10%	00%	05%
W	57%	64%	22%	50%	46%
total	100%	101%	99%	101%	100%

A questionnaire was given to the distance learning students in order to determine which of the interactive learning devices were most beneficial to learning and retaining text book material. The following ranking was obtained from most preferred to least preferred: key terms and people at beginning of chapter, chapter objectives, study guide/multiple choice, chapter assignment, study guide/fill-in-blank, "Quick Glance," journal entry, reading, study guide/essay questions, "Thinking Sociology," chapter summary.

The distance learning students ranked those features dealing with definition as most beneficial. Excluding the chapter summary, students found those features concerning application (i.e. higher level learning) as the least beneficial to learning text book material. Those features which the students found to be most helpful are related to passive learning while those features that were least helpful according to the student promote active (integrative learning). Learning theorists support active learning as a way of increasing acquisition of knowledge even though distance learning students do not tend to prefer these types of activities.

IV. Conclusions

The data supports one solution to the two stated challenges of student and attrition. The introduction of the interactive text book, *Looking Through the Window of Sociology*, did lower the attrition rate in both the sociology telecourse and independent study course at NHC. Not only was the attrition rate lowered, but grade distribution, as measured by final course grade, showed an improvement due to the greater percentage of students earning As and Bs. The data supports that active learning can be incorporated in a distance learning course through the text book and the distance learner can be provided with learning tools which facilitate student success. An interactive text book did increase retention of students and improve the grade distribution in the distance learning courses. Further research needs to be conducted to verify the effect of interactive exercises promoting active learning and critical thinking for distance learners.

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Improving Your Odds; The Role of Needs Assessment in Distance and Continuing Education

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Background

University Extension began as the continuing education branch of the University of California in San Francisco in 1891. At UC Davis, Extension offers nearly 2,600 courses and serves over 60,000 students each year. With a staff of 130, UCD Extension serves a 34 county area in California extending from the Oregon border in the north to Tulare County in the south, nearly half the area of the state of California.

UCD Extension, a self-supporting nonprofit organization, has only recently begun the transition from offering traditional continuing education programs to offering those same programs using a distance education format.

When faced with the prospect of introducing a new service in a new market, using new methods of distribution, the potential for failure is high. To minimize the probability of failure, UCD Extension conducted a needs assessment survey in the summer of 1993 to determine the market for potential students of distance education.

The survey specifically addressed:

- familiarity with distance education formats
- current attitudes toward distance education
- the acceptability of particular distance education programs to traditional classroom students in several different program areas
- when and where to offer distance education classes, and
- enrollment fee sensitivity

Methodology

Four hundred surveys were mailed to each of four academic groupings of previous students and inquiries in 1) Land Use and Environmental Planning, 2) Engineering, 3) Landscape Management and Agriculture, and 4) Environmental Hazardous Management (see "Sample Distance Education Survey"). The surveys were accompanied by a cover letter that described live, interactive distance education, and a return business reply envelope.

All the questions were straightforward, with the exception of number 6, a blind-survey question used to measure price sensitivity.

To survey price sensitivity we took the average enrollment fee of a one-day course in an academic area (e.g., $175 for an engineering course), and then presented each academic group of 400 with one of five options: the average fee, 25% and 50% **less than** the average fee, and 25% and 50% **greater than** the average.

Thus, each of the four academic groups of 400 was randomly split into five groups of 80 and each group of 80 was surveyed on one of the five possible price options (we felt that showing the group various price options would bias them toward responding towards the less expensive options.

Engineering, for example: $ 88
131
175
219
263

Results/Implications

Nearly 23% (360) of the surveys were returned. The results were loaded into a database, tabulated, analyzed, graphed and evaluated. A cluster analysis was also performed to identify the factors most important and least important to students. A summary of the results follows the sample survey. Briefly:

- Most respondents did not have previous experience with distance education.
- Of those who had experience with distance education, most were satisfied.
- Most expect a distance education course to be held in close proximity.
- Most prefer to attend courses on weekdays, particularly Tuesday, Wednesday of Thursday.
- Price sensitivity was not extremely high with most groups, except in the highest ranges ($281 - $338). In general, most felt that the price for a distance education course should be: 1) the same, 2) lower, or 3) only slightly higher than a traditional classroom course. They are not willing to pay substantially more for a distance education course. This may be explained by the perception of some respondents that they are giving up something (in terms of interaction and participation) in a distance education course vs. the traditional classroom setting.
- When asked which factors were most important, students ranked practical application, cost, time, and location highest while eight other factors mentioned by students trailed in varying degrees.

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Sample Distance Education Survey

1. Have you ever attended or enrolled in a course using distance education technology?
_____ Yes
_____ No (If no, please go to question 4)

2. If so, what kind of technology was used?
_____ Interactive television _____ Videotape
_____ Cable television Other
(specify)______________________________

3. What was your overall level of satisfaction?
_____ Very Satisfied _____ Dissatisfied
_____ Satisfied _____ Very Dissatisfied

4. How far would you be willing to travel to attend a course offered through University Extension using distance education?
_____ 0 - 25 miles _____ 51-75 miles
_____ 26 - 50 miles _____ More than 75 miles

5. What are the best days for you to attend a course? (Check as many as apply)
_____ Monday _____ Friday
_____ Tuesday, Wednesday or Thursday _____ Saturday

6. University Extension's PCA-credit one-day courses have an average fee of $85 when delivered in the traditional manner.

Assuming University Extension offered live, interactive telecourses that were 1) necessary to your professional development and 2) at a convenient time and location, would you enroll if the fee were $43?
_____ Yes _____ No

7. Which courses below would you be most likely to enroll in? (Choose up to three)
_____ Fungicides in Plant Disease Management
_____ Issues in Greenhouse Pest Management
_____ Pesticides: Principles and Resistance Issues
_____ Organic Pest Control
_____ Vertebrate Pest Management
_____ Predators, Parasites and Pathogens

8. What factors are most important to you when deciding to attend a course?
____

____

Please return the survey by August 7 to: Rita Smith-Simms, University Extension, UC Davis, Davis, CA 95616-8727. Thank you for your input.

Distance Education Survey Results
(All Four Academic Areas)

# Mailed: 1,600
# Responded: 360
Response Rate: 23%

1. **Have you ever attended or enrolled in a course using distance education technology?**

% of Total	Raw Data	Responses
16%	59	Yes
84%	301	No

2. **If so, what kind of technology was used? (Tabulation based on % of "yes" responses in question one.)**

% of Yes	Raw Data	Responses
36%	21	Interactive television
24%	14	Cable television
20%	12	Videotape

Other responses: printed material/US mail (Loyal Mary mount); audiotape and texts with mailed in assignments; conference telephone calls and satellite link to NYC; mail; satellite television hook up; satellite; instructor on-site to explain/expand as necessary; satellite; correspondence and phone contact only; satellite conference; standard television; mail; books; correspondence.

3. **What was your overall level of satisfaction? (Tabulation based on % of "yes" responses in question one.)**

% of Yes	Raw Data	Responses
12%	7	Very satisfied
68%	40	Satisfied
12%	7	Dissatisfied
2%	1	Very dissatisfied

4. **How far would you be willing to travel to attend a course offered through University Extension using distance education?**

% of Total	Raw Data	Responses
45%	163	0-25 miles
29%	105	26-50 miles
12%	42	51-75 miles
11%	39	More than 75 miles
3%	11	No response

5. **What are the best days for you to attend a course? Check all that apply. (Some respondents circled Tuesday, Wednesday or Thursday, or combinations of these days. These responses were coded as positive responses to "Tuesday, Wednesday or Thursday.")**

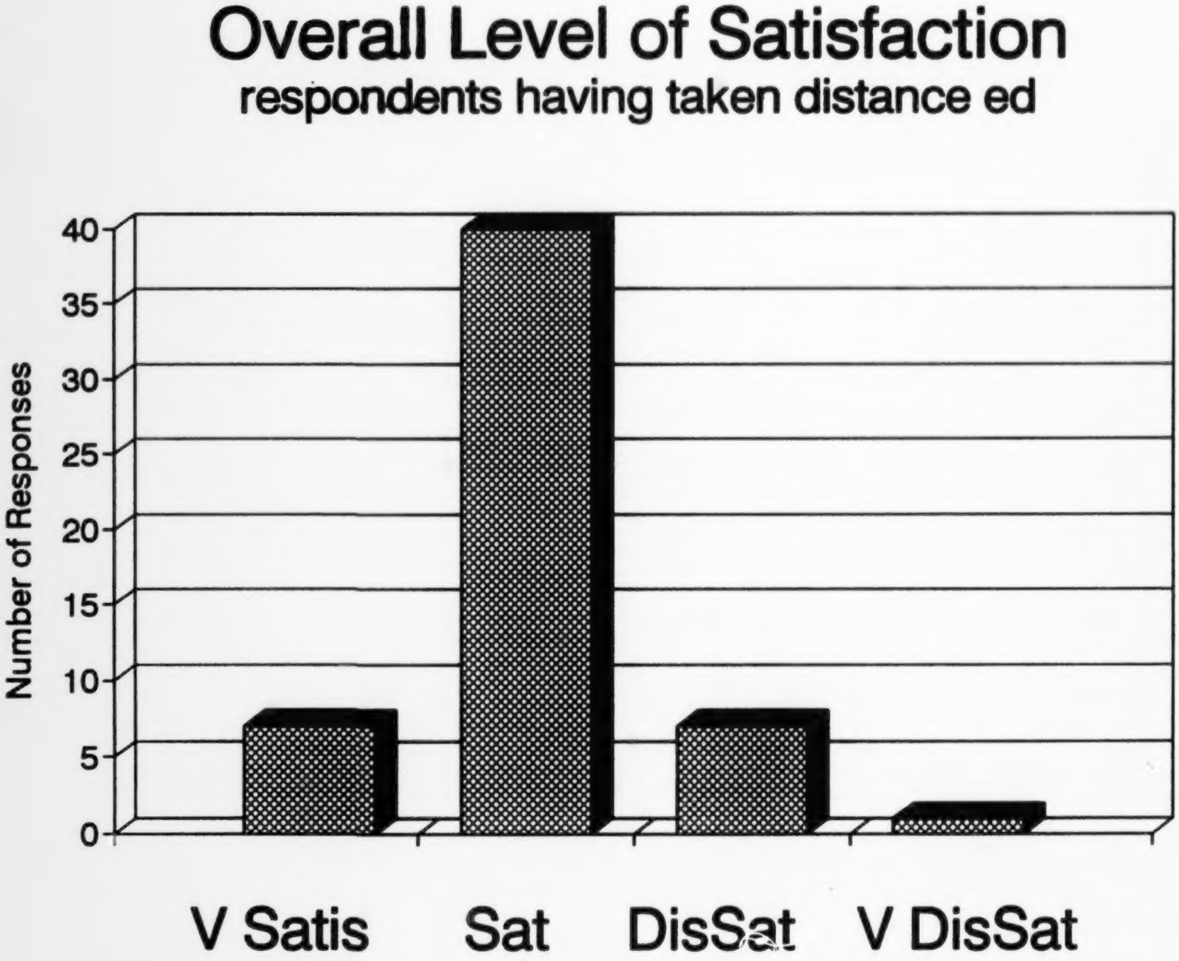
% of Total	Raw Data	Responses
22%	142	Monday
38%	247	Tuesday, Wednesday or Thursday
23%	149	Friday
17%	113	Saturday

6. **University Extension's (insert unit) one-day courses have a fee of (insert fee) when delivered in the traditional manner. Assuming University Extension offered live, interactive telecourses that were 1) necessary to your professional development, and 2) at a convenient time and location, would you enroll if the fee were (insert fee)? ("Maybe" responses were tabulated as "yes." This occurred approximately 10 times.)**

   see Enrollment Fee Analysis graphs

8. **What factors are most important to you when deciding to attend a course?**

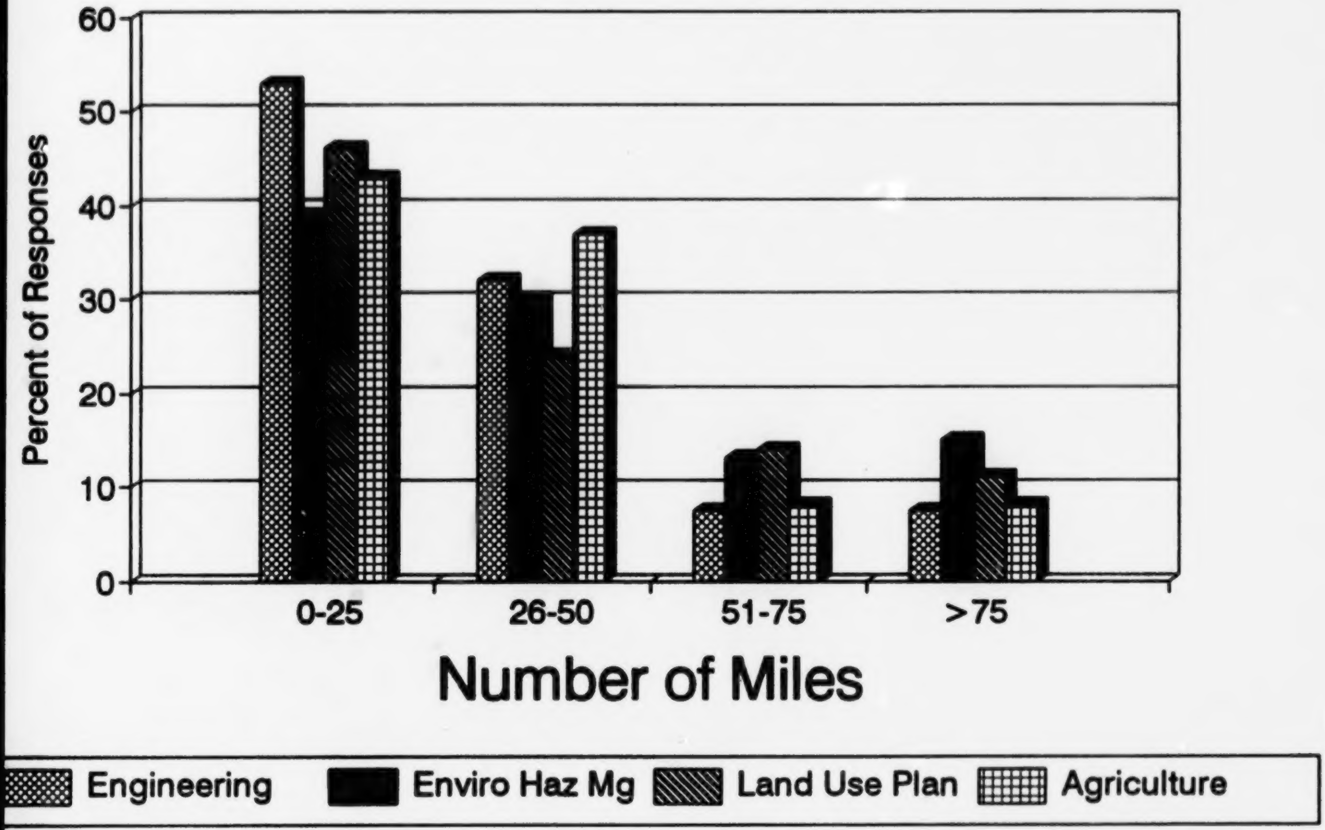
   see Distance Education Important Factors



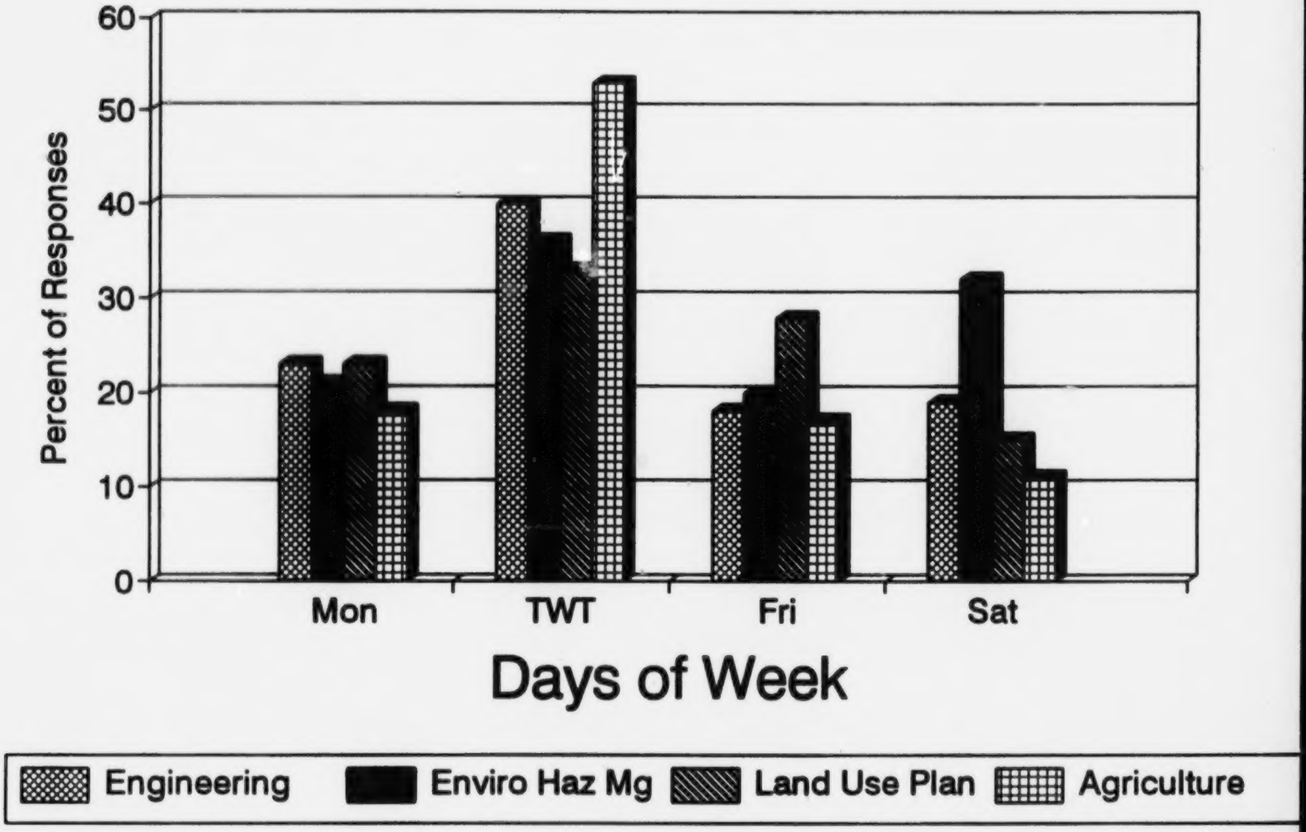
Overall Level of Satisfaction

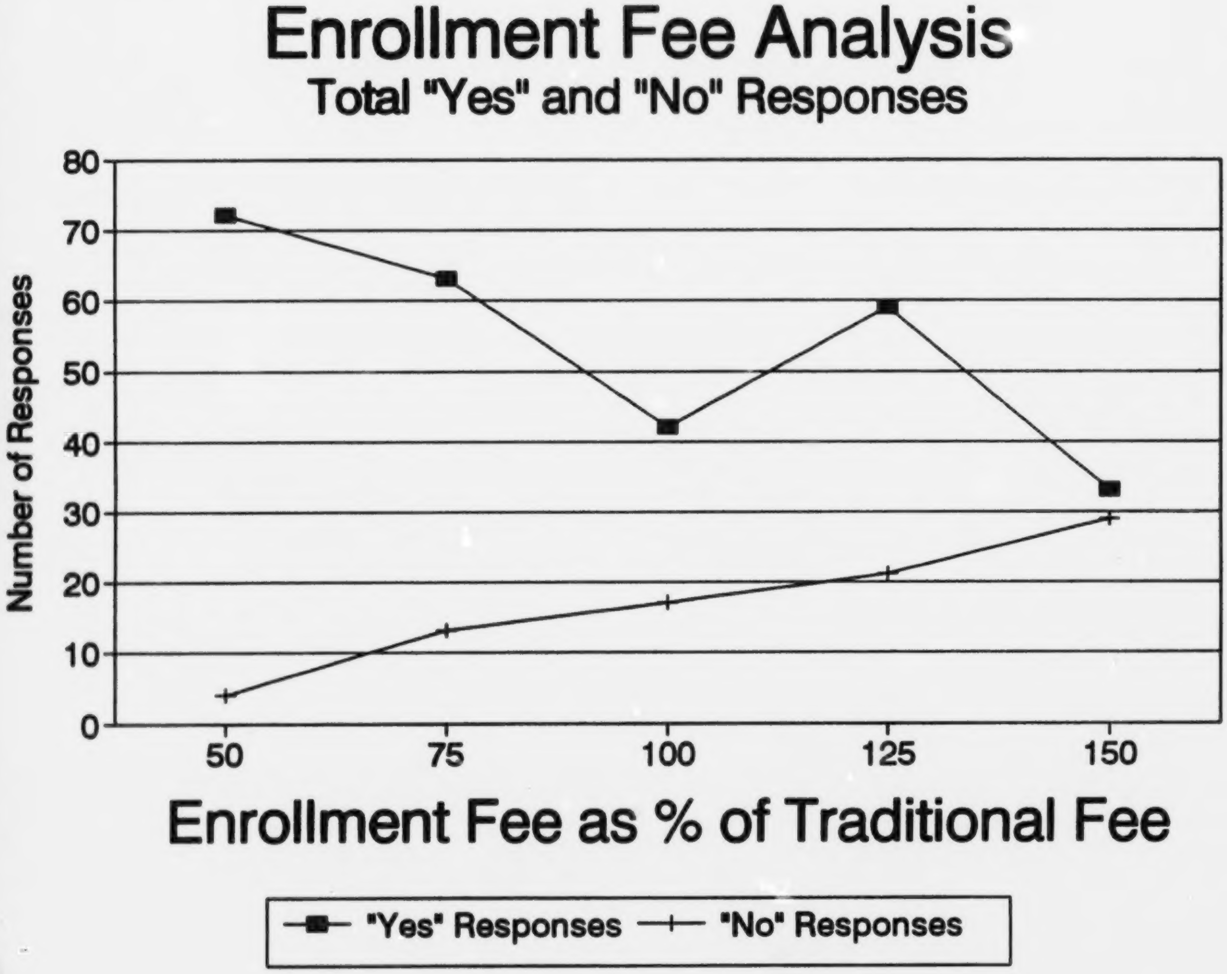
respondents having taken distance ed

How far would you Travel for Dist Ed

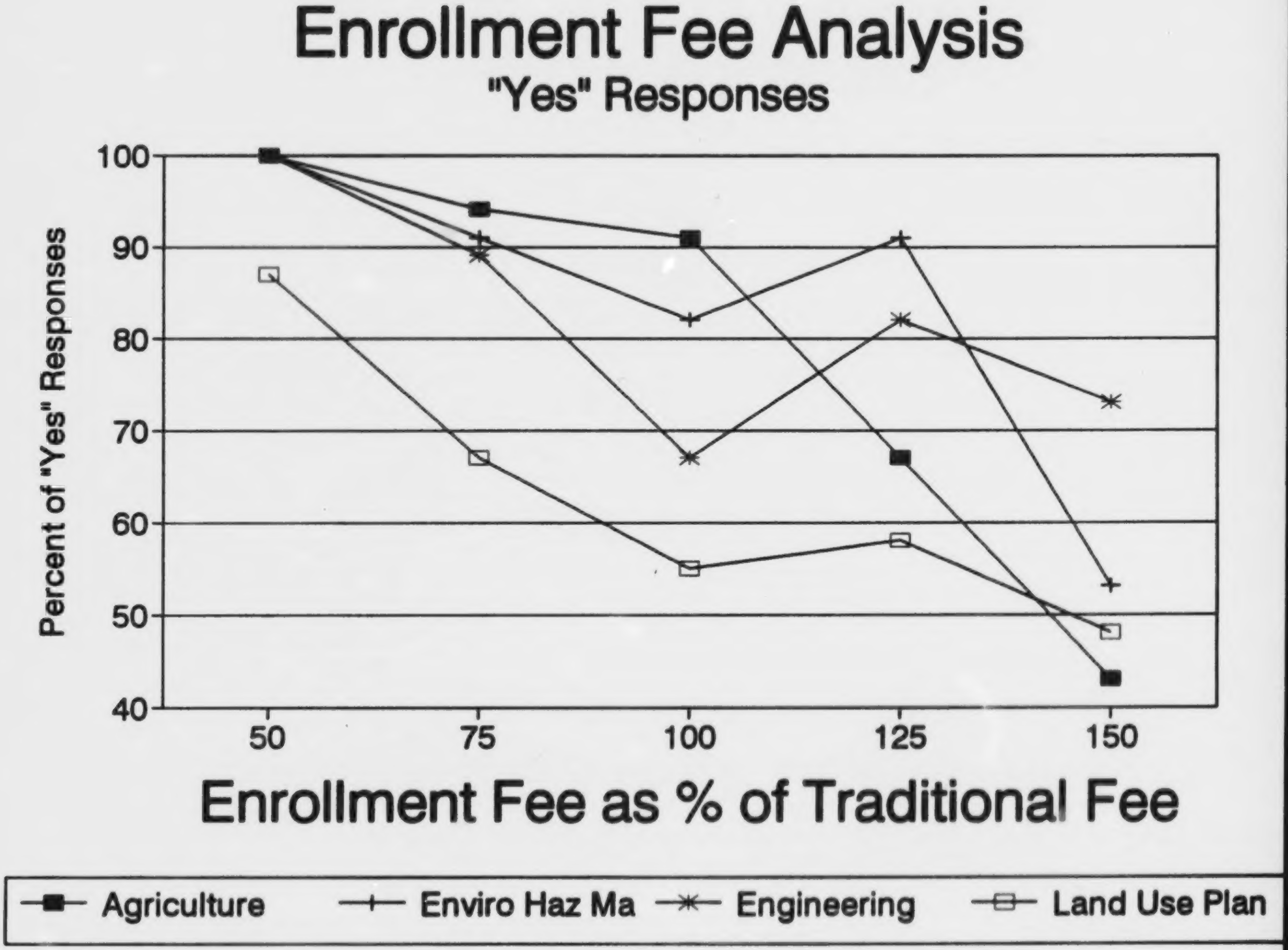


Best Days for you to Attend a Course?



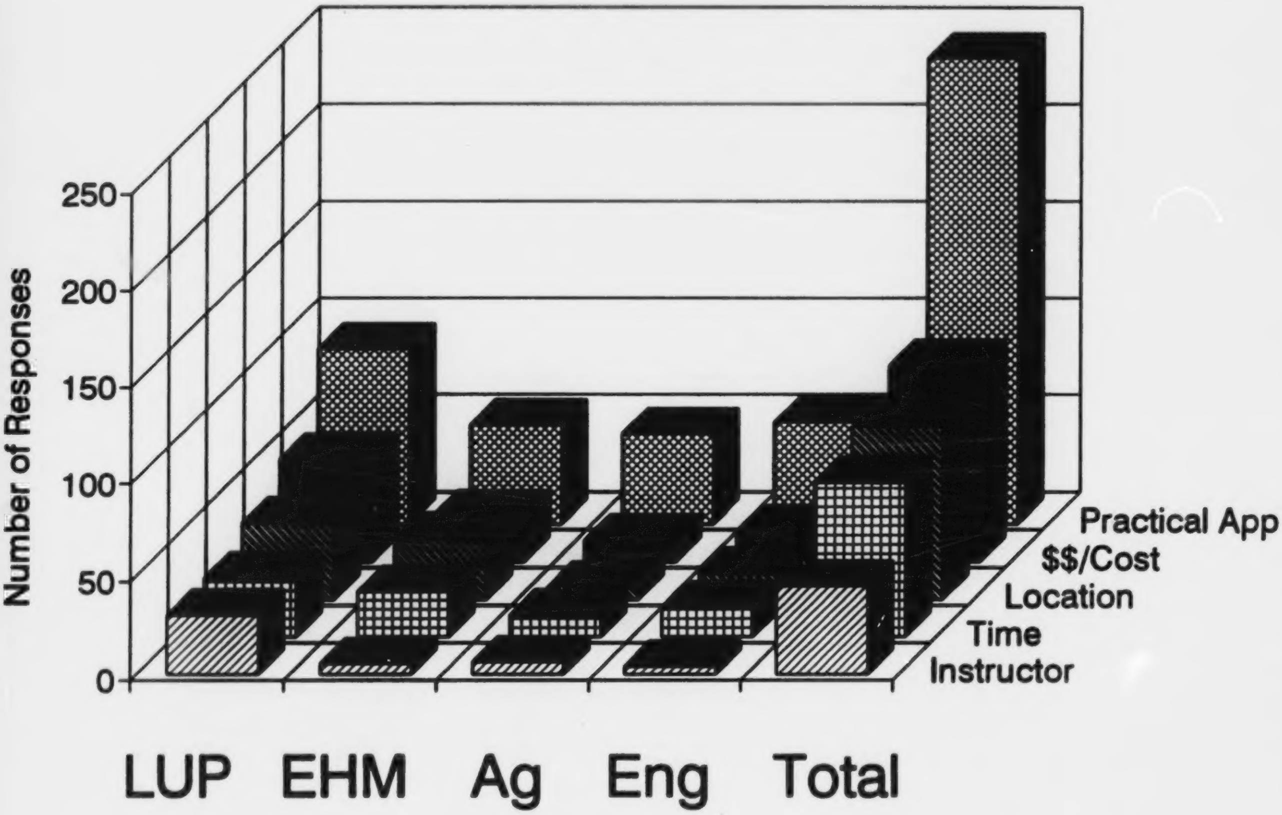


Enrollment Fee Analysis
Total "Yes" and "No" Responses


Enrollment Fee Analysis
"Yes" Responses
Percent of "Yes" Responses
100
90
80
70
60
50
40
50
75
100
125
150
Enrollment Fee as % of Traditional Fee
Agriculture
Enviro Haz Ma
Engineering
Land Use Plan

Important Factors to Students

Cluster Analysis



Distance Education Important Factors
UCD Extension Survey Question 8

Important Factors	Land Use	Env Haz	Ag	Eng	Total
Practical Application	90	51	47	52	240
Course Fee	52	23	11	15	101
Convenience (location)	39	31	6	13	89
Convenience (time)	30	23	11	15	79
Instructor	30	5	6	4	45
Professional Credit	3	3	4	3	13
Access to Instructor	8	3	0	1	12
Course Materials	3	1	0	3	7
Networking Opportunities	2	2	1	1	6
Accommodations	2	2	0	0	4
Totally Neg on Dist Ed	2	0	0	0	2
Class Size	1	0	0	0	1

A Critical Analysis of Comparative Research On Distance Learning Technologies

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University of Oklahoma

Introduction

Studies that compare the effectiveness of one delivery system over another are frequently utilized, especially when a new "hard" technology has become practical for educational applications. Decision-makers within educational organizations frequently request such studies in order to a) legitimize a new medium and/or b) aid in decision-making among possible media.

The application of telecommunications technologies in distance learning has renewed interest in media comparison studies among decision makers, with the focus of the research on the delivery system rather than the specific media employed. Once again the literature is dominated by studies designed to compare the effectiveness of one delivery system over another. In general, these studies have found distance education to be equally effective or somewhat more effective than conventional instruction (Moore & Thompson 1990, Whittington 1987, Dillon & Smith 1992). Based upon a meta-review of 150 studies comparing distance education learning to conventional classroom instruction, Dillon and Smith (1992) concluded that for the studies in which the learning differences favor either the distance or traditional instruction, differences other than delivery system could not be ruled out as key causal agents. Important factors include a) instructional task, b) learners' knowledge, motivation, and opportunity for transfer, c) the design/methodology of instruction, d) and teaching effort unrelated to the medium of instruction.

Typically the findings associated with studies comparing media and/or delivery systems are inconclusive. Criticism of media comparison studies focuses upon both conceptual issues and research design issues. The conceptual debate centers around the relationship between media attributes and learning. Clark (1983) claims that media comparison studies are inconclusive because media are mere vehicles used for the delivery of instruction, that it is the method rather than the media that affects learning, and that future media comparison studies are unwarranted. In contrast, Salomon (1982) and Petokvich and Tennyson (1984, 1985) argue that media comparative studies are inconclusive because media have different attributes which support cognitive processing in different ways. Typically media comparative studies fail to address the specific attributes of the media employed as these relate to learner and instructional task variables.

The authors assert that delivery system comparisons like media comparison studies can be valuable additions to both the research base and practice. In this paper, we describe the ideal criteria for conducing comparative studies in distance education. First, we argue that media comparison studies offer a conceptually sound basis for improving our understanding of learning at a distance while providing practitioners with valuable information for decision making. However, to be meaningful, media comparison studies must address the relationship among media attributes, key learner variables, and instructional task. Second, we address common research design problems in media/delivery system comparisons and pose solutions to these problems. Finally we address other critical design factors unique to distance education.

Conceptual Issues in Media Comparison Studies

Media comparison studies are frequently criticized as being confounded with other variables that may affect learning: a) instructional methods or content differences between treatments that are compared, b) novelty effects for newer media, and c) differences in effort and intensity of instructional design and/or teacher delivery (Clark & Sugrue, 1991). These factors pose threats to both the internal and external validity of a comparison study. The first confounding variable, differences in instructional treatments that frequently accompany media comparisons has received the most attention. For example, in studies that compare conventional, lecture-discussion-demonstration to one-way instructional television delivery, the conventional instruction may have features such as students' asking clarification questions and teacher's responses, or serendipitous review of relevant prior knowledge when students indicate confusion. And the video instruction may include replays of the same instruction from different angles, close-ups of critical features, etc.

In other words, frequently in media comparison studies the researcher "compares apples and oranges". It is not conventional instruction and video that were being compared in the previous paragraph, but different instructional strategies that support the cognitive processing necessary for learning. This problem arises from the fact that there are no defined constructs of "conventional instruction" and "one-way video instruction." The instructional design for each of these delivery media may vary considerably depending upon the nature of the instructional design, who the learners are, what the learning context is like, and which instructional attributes the media possess.

Some media comparison studies have attempted to control for the media-method confound (and the design effort/teacher issue) by delivering exactly the same strategy via the compared media: teacher-led instruction without the opportunity for student questions and other features that could not be implemented in a one-way video design versus a video of this same teacher delivery. Not surprisingly, in terms of learners' performance, such carefully controlled studies have found no significant differences. Of course, there may be differences in cost and time of production. However, these two "sanitized" versions of instruction do not represent optimal use of either conventional or video delivery.

From both a theoretical perspective and numerous empirical validations, there is no reason to assume that two delivery systems that provide exactly the same instruction should produce differences in learning. There are two predominant options proposed for dealing with the media-method confound.

First, to control for differences in method by ensuring that the instruction delivered via all alternatives is exactly the same, anticipating that there will be no differences in learning effectiveness. In such a study, the researchers can examine differences in learning time and costs of design and implementation to produce the same instruction on alternate delivery systems. The problem with this approach is that in equalizing the instructional method employed by each medium, the research designer is "washing out" the very differences that may make one medium a better choice for instruction for a particular learning task, for a particular group of learners, and for a particular instructional context.

We recommend a second approach for dealing with the media/method confound. Each alternative delivery system should be "defined" in a study by its instructional capabilities and the method that is made practical by the capabilities. This approach acknowledges that most media can deliver most methods, but it may be more practical and feasible to deliver a particular method, strategy, or technique via one medium than another. Following such a research design approach, the designer may develop each medium/treatment to capitalize on the attributes of the media and delivery system used. Instructional attributes of delivery systems may be described in terms of features which relate to bandwidth (or visualization), interactivity, and system interface (DeDe, date). Instructional attributes of media can be described in terms of features which relate to pacing (group-pacing, individualized pacing, external or internal pacing, speed of pacing), cueing (attention-gaining devices, amount of structure), modeling mental operations (supplanting), and transformation (linking visual and verbal storage) (Kozma 1986).

Failure to control for the influence of the teacher is another common design problem. Instructor differences across media do appear to confound the treatment variable. Kulik, Kulik, and Cohen (1980) found the effect size favoring computer-based instruction to reduce from .51 sd (a moderate, and generally practical important effect) to .13 sd (a small, and generally not practically important effect) when the same instructor delivered both mediated versions. Instructor variables appear to have accounted for the majority of the variance explained by the computer-based treatment. Several research design approaches can be used to deal with the potential confounding effects of instructor differences. These options are prioritized here based upon desirability with the pros and cons of each option identified.

The most desirable option is to use the same instructor to deliver all system treatments. With this option, the instructor should be well trained in each of the delivery system versions and how to teach with them. However, if multiple instructors must be used, there is the possibility of instructor differences influencing learning that have no relationship to the media or delivery system used. Although this threat is considered a normal problem during actual implementation of instruction, it is a significant problem in a controlled experimental study in which the validity of conclusions is critical and solid generalizability is desired. If the use of multiple instructors is the only feasible option, then instructor training will need to be more extensive and additional assessment of characteristics of instructors will have to be conducted. The training will assure more homogeneous familiarity and comfort with all delivery systems, and homogeneity of familiarity with targeted content. Also, previous measures of instructor effectiveness (if available) should be examined to attempt to select, equate, or control for these effects. Ideally, when using such a design, all instructors should deliver all treatments.

Often the distance and conventional treatments undergo different intensity and effort in instructional design or preparation. It is not uncommon (and in fact desirable in practical settings) to have the distance method receive considerable more design effort than the conventional treatment. However, there is evidence to suggest that more carefully designed instruction is more effective instruction (e.g., Mengel, 1986).

In some studies, the same content has not been delivered in each treatment, thus making it impossible to untangle the causation of effects of medium and content. For instance, a study which compares learning in one course delivered by the instructor in the conventional setting designed for a local audience and learning in another preproduced telecourse designed for a national audience delivered via broadcast television by a preproduced telecourse designed for a national audience, the objectives of the two courses may be identical. To prevent the confound of media treatment and content, all treatments should be designed from the same objectives and all assessments should be developed from the same criterion-referenced test item specifications and blueprints. Information content in introductions, new information presentation, examples, practice, feedback, summaries, etc. should be congruent. Whenever students and students interact or students and teachers interact there is the potential for new and treatment-different content to be introduced. Observers should be present to evaluate and validate the implementation of the treatments and note any major divergence from content.

Some of the studies comparing distance and conventional learning treatments often control for many of these variables, including instructional method/strategy variables, teacher variables, instructional design intensity, and content variables, since many of these studies compare the learning of learners at the originating and remote sites simultaneously. However, the media are not controlled since different delivery systems use different forms of visualization and interaction. Factors such as compression rate, level of system interactivity, and placement of the equipment may indeed serve as confounding factors and are rarely described adequately in the research. Lacking any standardized definitions of "conventional instruction" and the various forms of distance education, the researcher must operationalize each medium with detailed descriptions of its hardware configurations and characteristics, instructional attributes optimized, and instructional method employed for a particular task, learner group, and instructional context. Thus, the findings can have an acceptable level of generalizibility because the descriptions of treatments can form prescriptions of treatments for applications that can be replicated in other studies.

The design should include the implementation of aspects in an operational definition of delivery system and complete justification of why a particular instructional design was selected, and how the delivery system attributes were determined so that some casual inferences can be made beyond the hardware itself. For example, mental effort expended during learning has been related to media type (Salomon 1984). The amount of mental effort required has also been used to explain differences in alternative satellite systems (Dillon & Smith, 1992) and to learning achievement (e.g. Cennamo, Savenye, & Smith 1992).

Most comparison studies fail to accurately and adequately describe and/or classify the learning tasks that are examined by the research. As different instructional conditions and strategies may differentially affect learning of these various types and level of learning (Gagne 1985), some studies have failed to examine not only the effect of media treatment on terminal learning outcome, but have also failed to examine what may be differential effects on related learning within the larger learning task. We recommend that the research design examine the learning of terminal objectives and the learning of component skills and knowledge. Instrumentation should be developed by which the effects of the treatment can be measured on declarative knowledge, lower-order procedural knowledge (application of concepts and relational rules), higher-order procedural knowledge (application of procedures and problem solving), psychomotor skills, and attitudes.

In addition, few comparison studies have gone beyond the collection of immediate performance of the terminal learning task as a dependent measure by which to investigate effectiveness. The few media comparison studies that have examined more than retention effects have yielded equivocal findings (e.g., Fletcher, 1990). Due to the nature of distance education in which students and teachers are separated by time and/or distance, distance learners may have less input into course objectives and methods. As a result teachers may have more difficulty as they attempt to help students internalize the "meaning" of new material. Thus distance may in turn impact long term retention.

The "John Henry effect" results from a situation in which the instructor or instructors consciously or unconsciously attempt to sabotage a delivery system that is perceived as threatening to job security or future happiness. This issue can best be dealt with by emphasizing the advantages of each delivery system for the instructor during instructor training. In addition, instructor training should describe the necessary and powerful role of instructors in all treatments. Instructor attitudes toward each delivery system should be evaluated during pre-training, post-training, and post-implementation of treatments in order to examine equivalence of instructor feelings across delivery systems and to analyze any differential impacts upon learner performance.

Finally, the novelty of a new medium can promote higher motivation and attention, resulting in greater learning, than an old familiar form. Previous research does not clearly suggest the impact of media novelty effects on specific learners in specific settings. Nor does existing research suggest the length of treatment that may be necessary to obviate such effects. To assess the impact of novelty upon performance, students' initial perceptions of the media and their perceptions of the medium in their treatment, including perception of novelty, should be measured and the relationship of these effects to learning effectiveness, time, and other attitudes should be examined. The perception of novelty information should be collected at several points in the implementation of the study to provide information on any changes that occur in perceptions of the medium and its novelty over time.

An important threat to internal validity lies in the failure to use intact groups without providing evidence of equivalency of groups on key learner variables. Key learner variables include aptitude to learn, prior knowledge of content, motivation to learn the content, and preference of instructional locus of control. The most desirable option is random selection and assignment of subjects to treatments. If size of treatments is small, we recommend preassessment of these variables, to ensure equivalence of groups. If random assignment is not possible, then the assessment of these key learner characteristics is critical. If an analysis indicates significant differences in these variables among treatment groups, then the variables will be evaluated as possible covariates, to statistically control for these differences.

Another important threat to internal validity is the selection of instrumentation. Measures of learning typically involve the use of teacher produced exams which have not followed established methods for ensuring high levels of validity and reliability. Suen & Stevens (1993) distinguish between the ideographic (face value) and the nomothetic approaches (representation of a construct). Instruments which reflect ideographic data must be reliable, but require less stringent assurances of validity, because the data are by definition valid, since they are measuring an observable event. However, instruments which reflect nomothetic data, must meet the standards for reliability and validity, since these measures represent some unobserved construct. We argue that instruments which measure learning represent an unobservable event. Therefore, instruments should be developed or selected based upon persuasive evidence of content validity, construct validity, and, perhaps for some studies examining long-term effects, predictive validity. This process includes piloting and revision of instruments until there is evidence of acceptable validity and reliability according to such standards as the Standards for Educational and Psychological Testing (American Psychological Association, 1985).

Failure to document fidelity of implementation, that is to provide evidence that the instructional treatments were implemented as described serves as a threat to internal validity. Ideally, the study should provide evidence that the instructional treatments were implemented as described. Thus we recommend the development of an observation instrument to assess the "fidelity of implementation," using observers at both the sending and receiving sites. If the implementation cannot be evaluated on a continuous basis, systematic sampling should be used.

Significance testing alone fails to address the importance of differences identified. Whether or not a significant difference is practical depends on the interpretation of findings, which are highly situational (Suen & Stevens, 1993). Learning differences should include significance tests, actual percentage point differences, and effect size (magnitude of the result). This is especially important in educational research examining delivery systems comparisons in which large monetary investments may be made based upon the conclusions.

Likewise, data should be subject to analyses and tests to examine the degree to which data meets the assumptions of the statistical test employed and this analysis should be reported. In cases where assumptions are violated beyond the sensible use of the test, other, more appropriate analyses should be employed.

In summary, we have detailed the common threats to internal and external validity associated with studies which compare alternative delivery systems. Many of the problems associated with media/delivery system comparisons constitute threats to both internal and external validity. For example, media-method confounds not only make it difficult to ascribe causation to attributes of the medium, but they also inhibit generalization of findings to other contexts, an issue of ecological validity. Therefore, such issues must be addressed in research design not only to make individual studies sound, but also to build a solid foundation upon which generalizations across several studies can be made. In the section to follow, we identify other design factors that appear to be important to distance education comparative studies.

Other Critical Design Factors

Research studies comparing delivery systems should not only meet standards of internal and external validity, but should also consider more elaborate designs and additional dependent measures. Some studies have found that the superiority of one delivery system over another were related to certain learner variables, such as aptitude and locus of control (Daniel & Stevens 1976, Dille & Mezak 1991). Based upon a comprehensive review of the literature, we have identified four key learner variables which have been found to interact with instructional treatments (i.e. group-paced versus individualized-paced) on different occasions: aptitude to learn, motivation to learn specific content, prior knowledge of content, and preferred locus of instructional control (Dillon & Smith, 1992).

The presence of a facilitator at the receiving sites appears to have a positive effect on student attitudes. However there has been little investigation of whether the presence of a facilitator at the receiving site influences learner performance. Distance education research also rarely describes the exact role that these facilitators play. Thus comparative studies which use facilitators should provide clear definitions of facilitator roles and training for these roles.

Rarely do comparison studies examine the effects of the delivery system upon the variability of learning performance. Generally, statistical analysis for learning differences is confined to analyzing differences in mean performance. Especially in research comparing the effectiveness of media, analysis should also examine whether media/delivery system treatments differentially influence the shape of the distribution. Thus, the analysis should compare the homogeneity of variance across treatment groups. There are occasions in instructional design decision-making in which a treatment that produces greater homogeneity of variance might be preferred over an alternative with a slightly higher mean, but significantly greater variance.

Occasionally studies report large differences in the time span required for different treatments. This is often the case with treatments comparing group-based and individualized strategies. Although authors may speculate in their conclusions regarding this mechanism, these speculations rarely are substantiated by data. Differences in "actual learning time" can be considered a potential confounding variable that may have a stronger effect than the actual difference in the media/delivery system treatment. Although individualized treatments, such as computer mediated communications will typically differ in terms of actual learning time which compared to group-paced learning, these differences should not be excessive.

Although there is evidence to suggest that students at originating and receiving sites have quite different learning experiences, very few studies analyze this factor. Usually data for a distance delivery system treatment are pooled across the receiving and originating site. Data for receiving and originating sites should be analyzed first before pooling them for two reasons: First, to determine whether the rather different experiences of the two groups affect learning. Second, for statistical analysis purposes to determine if indeed the data can be pooled, as from the same population, for comparisons with other treatments.

Implications for Research

The focus of this analysis is upon positivistic research. We realize that to design studies which address each of the critical factors may be impractical in settings which are accessible to most researchers. However, when the purpose of research is to test hypotheses (such as the relative learning benefit of one delivery system in contrast to another), studies failing to properly address the threats to external and internal validity lead to unwarranted conclusions. Comparison studies in distance education are indeed limited by inadequate sources of funding to support the implementation of sufficiently controlled experimental studies. However, many of these issues can be addressed in applied settings.

Studies may not be as ideally controlled as we have suggested. Such studies can still be valuable if the authors clearly acknowledge the studies' limitations and describe treatments completely, including media and delivery system characteristics, methods, learning tasks, and learner characteristics. The first issue addresses the need to define and analyze the attributes of the media and the delivery system used and the effects of these attributes upon the cognitive processing. The second issue addresses the need to properly define the instructional task and study the interactions between the instructional task and delivery system. Finally, the third issue address the need to study the interactions between key learner variables, instructional task and delivery system. Even with less stringently controlled studies if these factors are clearly described, readers may more accurately draw conclusions about causation and generalizability. The authors suggest that comparative research which addresses these three issues will most likely lead to improvements in the design of instruction for distance education.

In conclusion, as long as administrators and other decision-makers request evidence of comparative efficacy of one delivery system over another, many of us will continue to try to design studies to answer their questions. However, experimental delivery system comparison research requires much more complex designs than many researchers have used in the past. We have attempted to summarize in this paper many of the problems in such research and some potential solutions.

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Customer-Driven Distance Education And Its Resulting Paradigm Shift

HARVEY R. STONE, Alliance for Higher Education

The Initial Paradigm

Workplace-based distance learners have, for nearly thirty years, enjoyed access to education and training delivered successfully by many of America's finest institutions of higher education. In many instances, and particularly in the fields of engineering and nursing, American colleges and universities enjoyed a relative monopoly in the distance education marketplace. Few, if any other information providers combined (synchronous and/or a-synchronous) delivery technologies, sources of state-of-the art information (research faculty) needed to improve professional proficiency, with credentialing valued by both students and employers.

As the result of a genuine lack of significant competition, those institutions engaged in distance education enjoyed a relatively free reign. And while many, particularly those early credit/degree granting (A)ssociation for (M)edia-based (C)ontinuing (E)ducation for (E)ngineers institutions including Auburn, Kentucky, Maryland, Massachusetts, Minnesota, Purdue, South Carolina, Southern California, Southern Methodist University, and others worked diligently to provide their region and sometimes the nation with quality programming, in this skewed market environment, higher education was generally little disposed to understand or work to satisfy "the customer." Few in the traditional academic community, including those who pioneered degree-oriented distance education, felt compelled to customize curricula or attend to the particular needs of off-campus participants. Fewer still, Rensselaer Polytechnic Institute standing out as one of few exceptions, worked to adjust individual course syllabi to meet company-specific schedules.

The marketing mantra was that off-campus students who, once having met traditional admissions requirements, could avail themselves of the same degree programs and courses offered their on-campus counterparts and (sometimes), after competing the same requirements, would receive the institution's credential.

Little thought was given to the fact, particularly among those who provided training and graduate-level education to technical members of the engineering community, that their student base was and continues to be in a tremendous state of flux.

During the halcyon days of the last decade, expansion among corporate giants in the computer (Apple, Digital Equipment, IBM, Wang, etc.) and defense (Boeing, General Dynamics, General Motors, Lockheed, Rockwell, Texas Industries, and United Technologies, etc.) industries precipitated a parallel growth among those universities providing graduate engineering education to the workplace. Partially spurred by consortia such as the National Technological University (NTU) and others, offering faculty found themselves with off-campus graduate enrollment numbering in excess of a hundred while on-campus matriculants numbered ten or fewer.

Just as the giants of American industry found comfort in mass production, with the underlying assumption that all could get whatever color Ford they wanted---as long as it was black---so did American higher education. By and large, graduate students in the workplace could get whatever degree they wanted as long as it was in electrical engineering. This degree program, offered with only minor variations from that offered on-campus, could only be accessed after the working engineer successfully ran the gauntlet of the on-campus admission officers who steadfastly required GRE scores, academic transcripts regardless of age, and letters of reference from faculty who might be long deceased.

In this environment, with its limited access to technology and willing providers, workplace-bound students and their employers, accepted traditional curricula, followed rules designed eons ago to serve full-time graduate students, paid premiums over tuition, and generally "made do" regardless of whether the programs offered met particular student needs or overall corporate requirements. (It should then offer little surprise that thousands of engineers throughout the country participated in completed graduate programs in electrical engineering offered by universities at-a-distance.

This is not intended to imply that accredited degree providers actively sought *not to identify and satisfy* non-traditional student needs. Rather, they did their best within the bounds of those cultural imperatives that drive higher education---bounds which are generally ill-suited to a coherent distance learning program designed to meet industry's unique needs.

Higher education, particularly Category I and II research institutions have historically been and by and large continue, to operate in supply (faculty)-driven environments. In all but the rarest instances do faculty participate in distance learning activities with anything approximating enthusiasm. As most will confirm, faculty participation is often keyed to the amount of available free time. As a result, distance learning degree programs are designed to operate at the margins of instructors' time.

Under these culturally mandated situations, campus program directors most often "take what faculty give" and to the best of their abilities, offer "candid classroom"/"talking head" experiences off-campus to students hungry for information and employers arguably believing that access to the latest knowledge-based technology is crucial in a competitive and highly unstable economy.

Regardless of these deficits, distance learning "took off" during the Seventies and Eighties. This was a period characterized, as least throughout the engineering community, as a time of rapid corporate expansion buttressed by the realization that human capital was a crucial raw industrial resource whose value was threatened daily by technologies' speed-of-light development. Computer and defense firms, large and small, recognized that their competitive position relied, to a great extent, on a highly educated workforce. Increasingly, engineers in these companies found that the route to personal achievement no longer solely rested on their possession of an MBA. Indeed, technical competency, evidenced by Master's Degree in Engineering, had palpable value. As a result, students wanted to learn, their employers saw value, and colleges of engineering (and others) were prepared to step forward. Thousands of graduate courses were offered to tens of thousands of students at hundreds of locations throughout the United States---and students, using traditional measures---learned. Nearly twenty years ago, Dr. James Gibbons, Dean of Engineering and his colleagues and Stanford's College of Engineering ("Science", 1977) found no statistically significant grade differences between students enrolled in traditional on-campus courses and those off-campus participants in the same courses offered at-a-distance through Stanford's Television Video Instructional effort. In a follow-on study, Stone (American Society for Engineering Education, 1990) found statistically significant variations (.0001) when measuring the rate of success and failure between traditional on-campus students, off-campus video degree students studying at-a-distance in real-time, and off-campus video degree students engaged in asynchronous study via videotape with the latter group showing the greatest likelihood of success (among those whose ages range from twenty-five to thirty-five). While both of these and numerous other efforts continue to support the belief that students can successfully learn when availed of the ability to access course work at a distance, it remains clear that off-campus students' success results, pure and simply, from the fact that (1) they wanted to learn, (2) were willing to work at it, and (3) enjoyed, via the delivery technology, access to the requisite information.

The past three decades taught distance educators numerous important lessons. Key among these is that the appropriate use of technology, in and of itself, does not cause learning but its inappropriate application can indeed impede knowledge diffusion. ***Few but the most inveterate "Teckkies" or those incognizenti new to education delivered by*** *technology staunchly hold that technology causes learning or that one delivery system and its application is appropriate for all audiences.*

Years of practice supported by trial and error continue to support two clear conclusions. Technology does not cause learning. While technology provides a learner access to information, whether or not it is learned is a function of the learner's desire.

Equally important is the realization that just as there are many types of learners, each with unique characteristics and needs, so must programmers recognize that (particularly with the availability of numerous technological choices) delivery systems need be matched to the particular circumstance they are being asked to redress. This is especially important in today's environment. No longer can those academic institutions which market distant learning assume that they living in a "cookie cutter" world in which what is good for General Motors is good for Ford, IBM, or anyone else. Or indeed, that what is good for one segment of General Motors is good for its employees throughout the corporation.

The Changing Environment And A New Paradigm

When observers fix firmly on today's distance learning horizon, at least that segment of the firmament whose stated mission is serving the working adult, one finds little that resemble the past. In the first instance, those students, companies, and industries who long supported distant learning's growth and development are, if they exist at all, no longer what we had become used to over twenty years. Faced with competition for resources and markets in an international environment complicated by inexpensive off-shore manufacturers and government subsidized research, development, and protectionism, education's partnership with "big business" has, with the economy, undergone structural alterations. Simply stated, yesterday's behemoths are struggling to ameliorate bottom line pressures by getting smaller. As this occurs, and with the advent of hiring freezes and related processes, there is a parallel increase in the age technical professionals. Both directly impact distance learning providers.

In the first instance, schools must now strain to meet the educational needs of a student population that is smaller, more geographically segmented, and having more specialized needs. Today's colleges and universities find themselves forced to offer more courses, each with fewer enrolles, over a more widely dispersed geography, just to stay in the same place.

Similarly, this generation's corporate customer is less interested in traditional disciplinary-specific degree programs. As just-in-time, flexible and computer-integrated manufacturing are, along with TQM, Demming, Taguchi, and others being incorporated throughout an ever widening circle of companies, so now is higher education being asked to think beyond the traditional disciplinary offerings. Where electrical, mechanical, and computer engineering were previously de rigueur, today's requirements are for multi and inter-disciplinary programs in new areas such as software and systems engineering as well as the management of technology.

As noted above, a smaller company is often an older company. As a result, and except in rare situations, the older a workforce, the less likely its members are to engage in and complete degree programs. Stone's (1990) study of over 8,000 graduate engineering students indicates a significant drop-off in credit/degree participation after the age of 35. This is not to imply that "older" engineers neither desire nor are interested in continuing education. Rather, the preferred format, still delivered at-a-distance, is short, to-the-point, not-for-credit and applied.

Regardless of whether the product delivered at-a-distance is degree-oriented credit education or not-for-credit training, today's distance learner demands a product that is more information intensive---and this requires a delivery system capable of meeting this need. Regardless of "production values" (and few have systematically indicated that "pretty pictures" impact performance among those who are determined to learn), it is clear that today's learner demands access to additional sources of information. Minimally, should a faculty teaching at a distance highlight a text or author, the remote student now requires the ability to review and access other sources either written by the expert in question or on the topic under discussion.

What Does This Mean (Why Don't They Love Me Like They Used To)?

This discussion began with the presumption of a skewed marketplace. Demand for services outstripping supply. This is no longer the case and the impact of a normalized market is significant. Programming's supply (and hence competition)--has risen dramatically. With the cost of technology decreasing to the point where it is simply a commodity and the "discovery" by institutions that students need not be limited to those whom faculty can touch and feel, more and more schools are getting into the distance education business. (A digression, but one warranted at this point. Clearly the cost of technology and delivery systems is on the decline. This new affordability will no doubt entice educational providers into the "business" and view technology's use as a way to expand their campus' reach. Unfortunately, while technology's cost can be quantified, as can the staff required to maintain and operate delivery systems, few stop to measure the true (soft) costs of a distance learning system, e.g. the staffs required to support faculty and students with all of the resources (library, counseling, registrarial, etc.) that today's distant learner both expects and demands.)

Where previously concerned with the paucity of available "software", today's companies now find themselves concerned with picking and choosing from wires and skies filled with solutions to any training problem (not solely supplied by institution of higher education, but also by such private sector entities as Westcott Communication, Whittle Communication, and companies such as EDS, TI, IBM, and others). This new dynamic, where supply at least matches if not exceeds demand, now places the shoe on the alternate foot. *Now, the customer, s/he who pays the piper, calls the tune!*

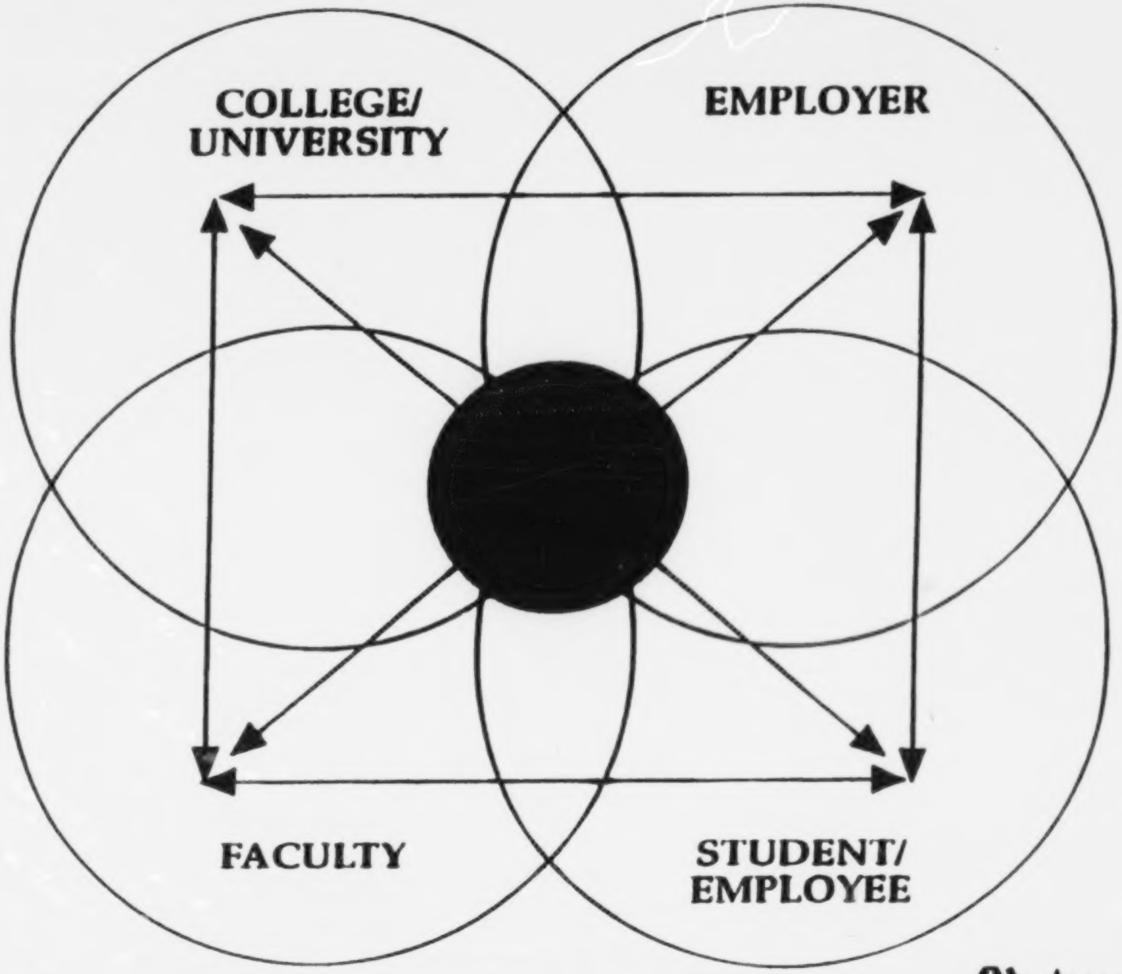
No longer concerned with geographic boundaries or local state regulatory requirements (what state controls the sky?) and with supply and demand in balance, consumers will choose based upon issues of need, convenience, and indeed cost. Soon, sophisticated distance learning consumers will demand providers to incorporate level III (impact on worker practice) and IV (impact on the corporate "bottom line" throughout their training.
new part of the environment.

Indeed, where the old paradigm was describe as a push system (the client will take what the provider "pushes" out, today's paradigm in "pull"---the client will pull from the offerings what is desired.

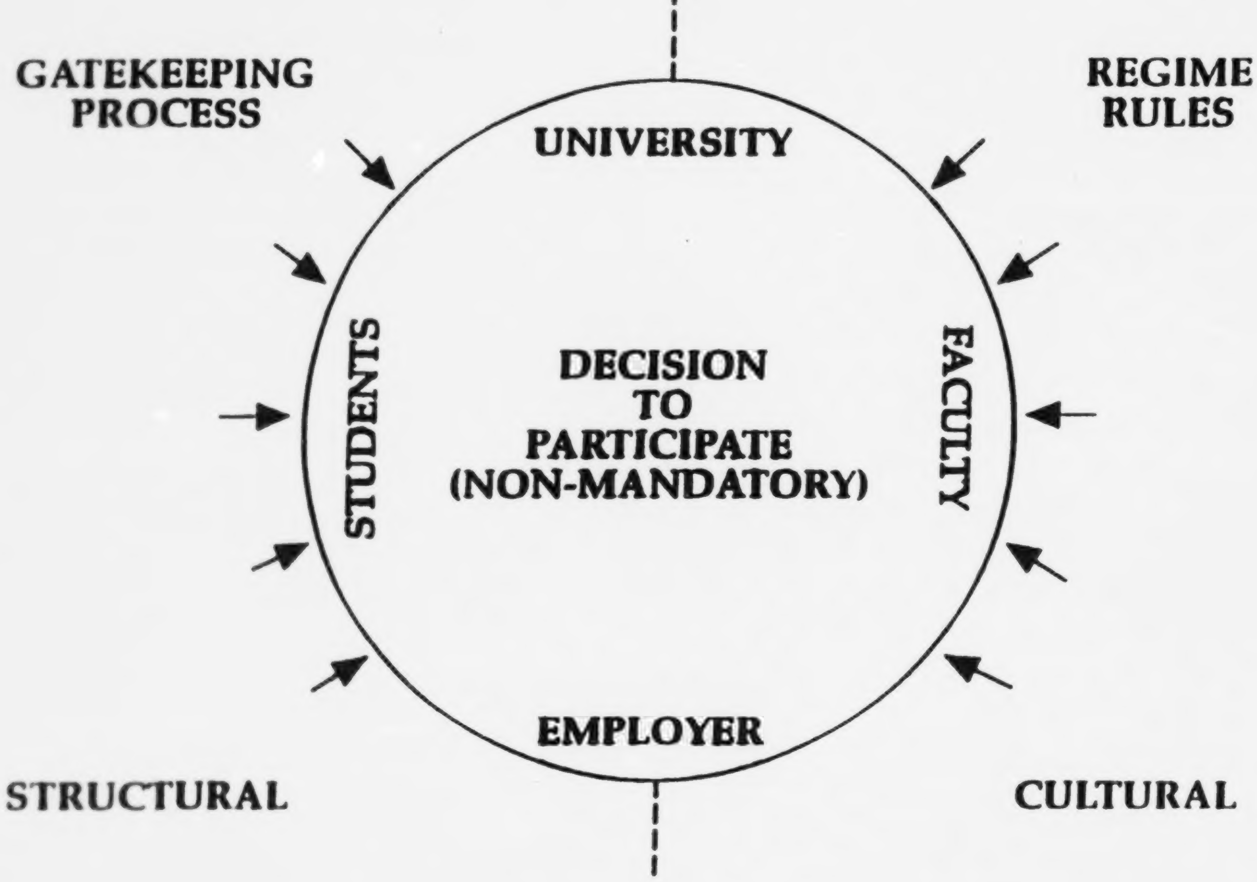
The emergence of "pull systems", (particularly among those corporations engaged in re-engineering through a total quality management effort) offers a host of new research questions. Many of these are concerned with the need to understand the entire distance learning enterprise and that it is indeed a system that goes far beyond "delivery technologies". Today distance learning providers, and purchasers, must appreciate not only the total system but the interrelationship among their key elements (university, faculty, employer, student) in what is primarily a voluntary arrangement (see Attachments #1 and #2).

While change is difficult, it is inexorable. Providers of distance learning must be prepared for its impact, choose to provide the full-spectrum of quality services, or leave the field to others.

The Environment for Success



ALLIANCE FOR HIGHER EDUCATION



GATEKEEPING PROCESS

REGIME RULES

UNIVERSITY

STUDENTS

DECISION TO PARTICIPATE (NON-MANDATORY)

FACULTY

EMPLOYER

STRUCTURAL

CULTURAL

ALLIANCE FOR HIGHER EDUCATION

Titration: An Experiment In Interactive Learning Environments

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Interactive learning environments have the potential to provide education with powerful new tools that could greatly enhance academic achievement for many who have been under served by the traditional educational system. To date, however, these tools have had only a minimal impact on education.

The objective of this paper is to describe research findings based upon the use of matched learning styles and instruction upon the academic achievement of students receiving an interactive learning experience in chemistry. The implications of this study are far reaching; not only does it provide chemistry professors with a tool to improve learning for many individuals who may have had difficulty in succeeding in traditional chemistry courses, but it also provides a unique alternative to educators for providing distance education aimed at accommodating individual differences.

This study demonstrates that style-specific instruction can be programmed into an interactive learning environment. It suggests that when students are presented with information in a format that best matches their learning preference, academic achievement may be improved. Universities have traditionally been delivering instruction in a "Broadway" style with replication of effort by live performers at a given site; the audience must go to the theater. The multimedia packaging approach, as illustrated in the Titration tutorial, assumes a "Hollywood" style; performances are duplicated electronically and the audience may participate vicariously.

Problem Statement:

This experimental investigation was aimed at determining the effect of matched learning styles and instruction upon academic achievement of students receiving an interactive learning experience in chemistry. The purpose of this study was to isolate four basic learning styles, design style specific instruction, and test their effect upon student academic achievement levels in an interactive learning environment (Van Vuren, 1991).

Methodology:

The experimental investigation incorporated a post-test only control group with a randomized research design. This design was chosen because it enabled the researcher to isolate dependent variables and test for statistical significance.

There were 197 subjects included in this study. All of the subjects were enrolled at Indiana State University and had either taken Inorganic Chemistry 103 or its equivalent. Each student was asked to complete Titration, a multimedia program that was designed to: (a) identify the student's learning style, (b) randomly assign an affiliation with either the Control Group or a treatment group, (c) provide style-specific instruction in chemical titration, and (d) test for academic achievement.

Chemistry is an experimental science which presents educators with unique set of teaching-learning problems. Because chemistry teachers believe that students will learn better if they can experience real world applications of scientific principles, laboratory experiences are designed into the curriculum. Titration is a multimedia package design to teach the theory and application of an acid-base titration.

Prior to entering the chemistry portion of the Titration interactive learning experience, students were asked to complete the Gregorc Style Delineator (1982), which placed them into one of four pre-determined learning styles: Abstract Random, Abstract

Sequential, Concrete Random, Concrete Sequential. The administration and scoring of the Gregorc Style Delineator was done by a separate computer program running simultaneously with Titration.

The instructional design of the Titration program involved several components. Students were given the Gregorc Style Delineator (1982), tutorials, computations, pretests, and a computer animated laboratory experiment. Four interactive instructional strategies were developed with identical content. The presentation method varied according to the individual's preferred learning style. The strategies were designed after the recommendations of Gregorc and Butler (1984). Students received immediate comments and remediation, and they were allowed to control the pace of the instructional material throughout the program.

To test the effect of learning styles on interactivity, all students were divided into four groups depending upon their learning styles preference. Students were then subdivided into a treatment group and a control group.

The treatment group received style-specific instruction in an interactive learning environment. Upon completion of the Titration program they were given a test that was designed to assess their academic achievement.

The control group received style-specific instruction that did not match their preferred learning style. The random selection was made based on the computer's clock.

Upon completion of the Titration program all students were given a test that assessed their academic achievement. The results of the test were entered into the individual student's database record.

Results:

The results of the study were analyzed using an analysis of variance statistical procedure. The analysis of variance statistical procedure was chosen because it provides a procedure for separating the variation that was present into independent components. A *Duncan's multiple-range* test was used to establish if there were any significant differences among treatment groups.

The dependent variable in this study was the percentage of correct responses on an academic achievement test. Independent variables were Abstract Random, Abstract Sequential, Concrete Random, Concrete Sequential and Control. All tests of significance were made at the 0.05 level of significance. The mean scores for each of the treatment combinations are located in Table 1. The scores represent the percentage of correct responses on the academic achievement test.

A summary of the analysis of variance is located in Table 2. The analysis of variance separates the variation of the sample group into independent components. These components were then analyzed to test for significance.

Table 1
Means and Standard Deviations for Achievement Test Scores by Learning Style

Learning Style	Mean Score	Subject Total
Control	37.41	37
Abstract Random	59.61	36
Abstract Sequential	50.00	30
Concrete Sequential	49.47	60
Concrete Random	52.12	34
Total		197

(Van Vuren, 1991).

The results of the analysis of variance revealed a statistically significant difference in academic achievement test scores between the treatment groups that received a matched tutorial, and the control group, which received an unmatched tutorial. Table 1 showed a marked difference in average mean scores that was verified by the *Duncan's multiple-range test.* The analysis of variance yielded an F-ratio of 5.6466 that was considered significant when tested at the 0.05 level of significance.

Table 2
Analysis of Variance Achievement Test Scores by Learning Style

Source	D. F.	S. S.	M. S.	F-ratio	F-Prob
Btwn Gps	4	9331.58	2332.89	5.80	.0003*
W/in Gps	192	77217.94	402.18		
Total	196	86549.51			

* alpha <0.05

A summary of the *Duncan's multiple-range* test was given in Table 3. The *Duncan's multiple-range* test separated the significantly different means into subsets of homogeneous means. An asterisk is used to denote pairs of subsets which were found to be statistically different from each other when tested at the 0.05 level of significance.

Table 3
Duncan's Multiple Range Test Achievement Test Scores by Learning Style

Duncan Procedure Ranges for the 0.05 Level

		2.79	2.94	3.03	3.10	
Mean	Group	Grp 1	Grp 5	Grp 2	Grp 4	Grp 3
37.40	Grp 1					
49.47	Grp 5 *					
50.00	Grp 2 *					
52.12	Grp 4 *					
59.61	Grp 3 * *					

* denotes pairs of groups significantly different at the 0.05 level

Grp 1 = Control Group
Grp 2 = Abstract Sequential
Grp 3 = Abstract Random
Grp 4 = Concrete Random
Grp 5 = Concrete Sequential

Implications for distance learning:

No area of education stands to benefit more from advances in technology than distance learning. For over one hundred years, nontraditional students have used traditional correspondence courses, which utilize self-paced study guides and handwritten assignments in order to achieve their educational goals. Unfortunately, most teachers teach as they were taught. For those of use who were taught via the traditional correspondence courses, this translates into a reluctance to accept technologically based alternative teaching methods.

Creating an interactive learning environment is somewhat like producing a self-paced study guide. It requires the same type of careful attention to content, theory development, sequencing, and visual design as is necessary in the production of a self-paced study guide. In addition, the multimedia packaging approach gives the instructor exciting new options such as full motion video clips, sound, animation, and an assortment of graphics and pictures.

Compared with traditional distance learning delivery methods, the development of an interactive learning environment is a far more complex and labor-intensive process. As is often the case, novices tend to get lost in the glitter of new technology and loose sight of the true purpose that of student learning (Howles, 1993).

Are the benefits gained by the new technology worth the cost in development time and equipment? Multimedia, when used to produce interactive learning environments such as the Titration tutorial, offers a powerful, flexible, instructional delivery system.

The study described herein demonstrates that style-specific instruction can be programmed into an interactive learning environment. It also suggests that when students are presented with information in a format that best matches their learning preference, academic achievement may be improved. This has been confirmed in a recent study (Gee, 1990). This case considered the effects of students' preferred learning styles on academic achievement and attitudes toward the learning environment in a distance learning setting. Gee's findings suggest that learning style preferences may affect academic achievement, and attitudes of students involved in distance learning. What then is the benefit? The benefit is that interactive learning environments can be far more productive and flexible, attuned to learning styles difference among individuals and ultimately able to increase the quality of distance education.

Another benefit offered by the utilization of the multimedia packaging approach is the availability of real-time video. Multimedia technology allows students to interact with on-line material, including on-screen laboratory demonstrations such as those found in the Titration tutorial. These are especially useful for distance learners who cannot come to campus to perform experiments.

Finally, the multimedia packaging approach, as illustrated in the Titration tutorial, duplicates information electronically and allows the student to participate vicariously. Like the self-paced guides, interactive learning environments allow students to work at their own rate. However, unlike traditional distance learning, the multimedia approach allows students the freedom to choose from a variety of subject related projects.

It is obvious that technology will play an increasing role in distance education. As we contemplate new investments in distance education, let's at the same time consider the educational returns. The integration of real-time, interactive video, sound, and data made possible by interactive learning environments utilizing multimedia technology holds more potential for enhancing distance learning productivity than any other technology developments in our history.

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Student Perceptions Of And Motives For Participation In Distance Education Using Television: The Ball State University M.B.A. Model

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Introduction

Due to the changing demographics in the United States population, universities with increasingly tighter budgets and/or limited resources are experimenting with telecommunications technology to reach a shrinking student population. Business schools lagged behind community colleges and universities offering engineering education in the development of televised courses (Delbecq and others, 1989). Perhaps, business education was guilty of failing to shape one of the critical new educational opportunities.

Ball State University took the lead in delivering televised instruction to distance learners in Indiana. They were the first school in Indiana to experiment with the medium of closed-circuit television to deliver an accredited (AACSB--American Assembly of Collegiate Schools of Business) M.B.A. program. Previous evaluation of this televised graduate program was limited. Therefore, information gathered from this research provided a measure of performance to gage "how they were doing". Knowledge of the "problem areas" provided meaningful insights to Ball State faculty and administrators regarding appropriate program changes or refinements that better served the interests of the students and faculty.

Adults enrolled in "nontraditional" degree programs had been studied frequently, and descriptions were reasonably consistent across most studies. Perhaps the most distinguishing characteristic of these students was that they were considerably older than traditional students. Sosidian and Sharp (1978) studied 1,486 graduates from thirty-two external degree programs (both graduate and undergraduate) offered in the United States. The median age of the group was 36 but more than one-third were over 40 when they completed their external degree programs. Since participants in distance learning programs were generally older than traditional students, they were more likely to experience employment and family constraints limiting access to traditional educational opportunities. While most students rated independence and an individualized approach to studies as important, they regarded the absence of residential requirements as somewhat more important. The personal satisfaction of having pursued and completed their degree programs was far and away the most important goal for adults pursuing external degrees, followed by having the credential as a prerequisite to further study and job advancement. Surveys conducted in England, the United States, and Australia revealed the nature of typical students enrolled in distance education programs. Students were between the ages of 20 and 40; from both metropolitan and rural areas; employed full- or part-time; unable to attend traditional programs because of restraints of time, location, disability, work, or home commitments; unable to afford the additional living expenses to attend the traditional college or university; and/or working toward upgrading certification or job qualifications (Stanford, 1980; Woodley, 1981; and Naylor, 1985).

The authors attempted, in the following pages, to explain the purpose of the research undertaken, the methodology used, and to report on the implications of the findings (i.e., demographic profile of the sample population studied; logistical, personal, and professional motivations for participation; and perceptions regarding the quality of the faculty, program, and technology).

Statement of the Problem

The purposes of this research study were to assess the perceptions of students regarding Ball State's distance education program known as the MBA/TV, to identify the student's motives for participating in this televised program, and to compare those with motives identified in the literature for participating in similar distance education programs.

Methodology

Due to the geographic dispersion of the student population, the need for anonymity, and the complexity of the questionnaire, a written survey containing both open- and closed-end questions was used to collect data. The sample population (n) consisted of 209 (209/415 or 50.4%) MBA/TV participants who responded to the mailed survey.

Results and Implications

Demographic Profile

Students participating in the MBA/TV program who responded to the survey were predominantly male. Male respondents (141/209 or 67.5%) outnumbered females (67/209 or 32%) by more than two-to-one. The majority of the respondents were married. Marrieds (165/209 or 78.9%) outnumbered singles (42/209 or 20.1%) by nearly four-to-one. Over seventy percent (71.3%) of the participants responding to the survey were between the ages of 22 and 32. Nearly fifty-eight percent (57.9%) were between the ages of 26-32 years. Twenty-eight percent (28.3%) were over 35 years of age.

Logistical Motivations for Participation

Students reported they participated in the MBA/TV to avoid driving 25 miles or more to a university. The majority (120/209 or 57.4%) reported living at least 25 miles from a university offering a similar program. Many (87/209 or 41.6%) lived over 25 miles from a university library. Nearly seventy-two percent (71.7%) rated the fact that the MBA/TV program was received in the respondent's hometown on the high end of the importance scale. Over eighty percent (80.8%) reported that it was important for the MBA/TV to be offered at convenient times. Responses to the open-ended questions reinforced this information. A total of one hundred and fifteen students (55%) reported that a strength of the Ball State program was that the classes were offered at convenient times.

Perceptions of the Quality of the Faculty/Program

Most of the respondents (161/209 or 77%) considered their professors to be at least average or above. Over forty-seven percent (47.4%) rated their last professor as either good or superior. Nearly thirty percent (29.7%) rated their last professor as average. However, several (46/209 or 22%) reported that their professors were below average. Most of the students (129/209 or 61.7%) found their courses to be challenging; rating their last class on the high end of the challenge scale. Several respondents (36/209 or 17.2%) did not consider the MBA/TV courses to be challenging; rating their last class on the lower end of the challenge scale.

The respondents also provided a variety of comments regarding the quality, flexibility, and experience of the MBA/TV professors. Seventeen (17/209 or 8.13%) made comments like, "The professors I have had so far are experienced TV professors". This allows them to teach effectively even though most of the students are not in the classroom". Other comments included: "The professors are cognizant of the somewhat limited interactive capabilities of the program and that while the TV students aren't present they are still interested in the class and curriculum"; "Some of the professors have unrealistic expectations and lack of real world experience or knowledge of non-traditional graduate students"; "The faculty who teach on TV are of limited value. I have advised others not to start the MBA/TV program because of this"; "There was a wide range of instruction quality--from very good to mediocre"; and "The faculty performance should be more rigorously monitored and that more emphasis should be placed on instructional quality in the MBA/TV program".

Library resources figured heavily in an AACSB-accredited MBA program. In meeting AACSB requirements, several courses in the MBA/TV program required access and use of library resources. Students learned of library requirements through a variety of sources. Information sources regarding library requirements included: (a) discussions with the graduate coordinator; (b) discussions with other students who had taken a course previously; (c) discussions with faculty prior to beginning a course; and (d) course syllabi. With this in mind, students were asked to indicate the number of times they used a university library to do research related to class assignments. Over twenty-nine percent (29.2) of the students had never used a university library while on the MBA/TV program. However, more than thirty-seven percent (37.3%) had used a university 3-4 times while on the program. More than half of the participants used a university library over three times. Nearly seventy percent (68.4%) reported using a university library to do research related to class assignments. Eight (8/209) respondents cited the inability to easily access and use library and computer resources as a weakness of the MBA/TV program. Students were also asked to indicate the number of miles they lived from a university library. Nearly fifty-seven percent (56.9%) lived within twenty-five miles of a university library. Nearly eighty-two percent (81.8%) lived within fifty miles of a library. Approximately seventeen percent (16.8%) lived over fifty miles from a university library.

Participants were asked their opinions of the library assignments required as part of the MBA/TV program. Nearly sixty-two percent (61.7%) believed their library assignments contributed in important ways to the course objectives. About twenty-nine percent (28.7%) believed they would miss little of the course by not doing the library assignments. Over fifteen percent (15.35) had been given no library assignments at all. However, some MBA/TV courses did not lend themselves to library assignments. Quantitative courses such as accounting and statistics were examples of courses which may not have had library assignments.

A seven-point scale was used by students to indicate the degree of challenge they experienced with their last MBA/TV class (1 = not challenging; 7 = very challenging). Nearly 32% (31.6%) rated their courses at level five--which was relatively high on the challenge scale. Another 25% (24.9%) rated their last course at level four and 10% (19.1%) rated theirs at level three. Related responses to open-ended questions included: "I've found that generally the courses are challenging to the point of requiring more work and time than I can spare from my job and family." "The MBA/TV program has rigorous requirements--all courses required a lot of studying to successfully complete." Several students (13/209) provided responses similar to the following: "Some of the professors have unrealistic expectations and lack real world experience and knowledge of non-traditional graduate students. When they give a study plan (i.e., papers and dates) they should stick to it and not add additional requirements as the course goes on". Opposing opinions were also cited in the open-ended responses to the student survey. One student stated "Maybe this is due to my engineering degree, but I feel that the professors do not expect much in terms of mathematical background. Too many of the students do not even know basic calculus skills".

Perceptions of Technology

The respondents reported generally favorable experiences with the TV technology. Most respondents (201/209 or 96.1%) reported that they received good television reception at their site. Responses regarding the failure of a site to receive an entire televised session were more varied. Sixty-one (61/209 or 29.2%) respondents reported a failure rate of 0-2 times; sixty-seven (67/209 or 32.1%) reported a failure rate of 3-4 times; and forty-two (42/209 or 20.1%) reported a failure rate of 5-6 times.

Students were asked to indicate their experience during their last class when trying to contact their professor by telephone. Of those responding, nearly fifty percent (49.3%) were successful about ninety percent of the time. Over seventy percent (70.4%) reported reaching their professor about seventy-five percent of the time. One related comment reported on the open-ended portion of the survey was "The MBA/TV program is not conducive to close student/professor relationships for off-site students". This same individual recommended that "professors expand their office hours when teaching TV classes to allow more time for one-on-one contact with TV students".

Personal/Professional Motivations for Participation

A series of questions were asked to determine the student motives for participating in the MBA/TV program. Students responding to the survey rated the fact that the program was delivered in their hometown (at a public reception site) (150/209 or 71.7%) or at their place of employment (121/209 or 57.9%) on the high end of the importance scale. Most students (169/209 or 80.9%) found that the courses were offered at convenient times (evenings and Saturdays). The majority of the respondents worked and the time factor for course delivery was important for their schedules. Several (151/209 or 72.2%) considered AACSB accreditation to be important. A majority considered the opportunity to earn an MBA (190/209 or 90.9%) and upgrade their work skills (157/209 or 75.1%) to be important. Most of the students (174/209 or 83.3%) also considered the opportunity to learn more about business concepts/practices to be important.

More than sixty percent (60.7%) of those responding considered the issue of their employer was paying for the cost of the program was important. Over fourteen percent (14.3%) rated this issue on the low end of the importance scale. Students were also asked to rate the importance of "having their employer encouraging participation in the MBA/TV program". Over thirty-one percent (31.1%) considered this important. About the same number (31.5%) did not consider this to be very important. Respondents also rated the "importance of the MBA/TV being accredited by AACSB". Over seventy-two percent (72.2%) considered this important. Only ten percent (10.1%) did not consider this important. Nineteen respondents (9.1%) cited AACSB accreditation as a strength in the open-ended section of the student survey.

Room and board expenses generally incurred with an on-campus program were avoided through participation in the MBA/TV program. Therefore, students were asked to rate the "importance of the total cost being inexpensive in relation to an on-campus program". Twenty-seven percent (27.3%) rated this as important. Over thirty-three percent (33.5%) rated this as not very important. Another thirty-one percent (31.6%) rated this in the middle of the importance scale.

The students' ratings regarding the importance of the "reputation of the BSU College of Business" were also collected. About thirty-five percent (34.9%) rated this as important. Nearly twenty-two percent (21.5%) rated this as not very important. Approximately thirty-seven percent (36.8%) rated this characteristic in the middle of the importance scale. One responded in the open-ended portion of the survey reported that "Ball State's reputation as a quality MBA school has helped make this program worthwhile".

Over ninety percent (90.9%) of the respondents rated the "opportunity to earn a degree" as important. Relatively few rated this in the middle (6.2%) of the importance scale. One student respondent stated that "Ball State is responsive to the needs of working people seeking further education while continuing their employment. Nearly fifty-two percent (51.7%) rated the "opportunity to learn more about a specific subject" in the middle of the importance scale. approximately fifteen percent (14.8%) rated this issue as not very important. However, several students made comments similar to the following: "The MBA/TV program provides students with knowledge that they can immediately apply in the real business environment". Over seventy-five percent (75.1%) of the students responding rated the "opportunity to upgrade their work skills" as important. Over eighteen percent

(18.2%) rated this in the middle of the importance scale. The responses regarding the "opportunity to learn more about business concepts" were interesting. Over eighty-three percent (83.2%) of the students rated this as important. Nearly thirteen percent (12.9%) rated this in the middle of the importance scale.

Implications and Recommendations

Many potential MBA students (junior and middle managers) are unwilling to attend programs offered in "traditional" ways and find lecture and seminar attendance several times a week incompatible with their job demands, family responsibilities and personal study preferences. If distance-taught MBAs and other management-education programs are to succeed as alternatives to traditional, campus-based education, they must address particularly the issues of interaction between staff and students, group interaction between students, and access to library and computer facilities. It is these issues on which a distance-learning program such as the MBA/TV can falter.

It is recommended that Ball State's business educators learn to incorporate the principles of adult learning into the design and delivery of televised instruction. As Knowles predicted (1986, p.4) "By the end of this century most educational services will be delivered electronically by teleconferencing, cable and satellite television, computer networks and other means yet to be discovered--provided educators learn how to use the media in congruence with principles of adult learning." Care must be taken to ensure the careful integration and application of the new technologies into the learning environment. "It seems appropriate for those interested in teaching and learning, including those whose interest is primarily in the teaching and learning that occurs outside the classroom, to grasp opportunities to influence the design of new technology systems to work for learners, rather than to require learners to adapt to the requirements of technology (Gooler, 1987, p. 72)." Thus, despite technological advances, meeting the needs of individuals while simultaneously seeing to it that learners are central to the process will remain a major tenet of adult business education.

The authors recommend that the study be replicated using a different televised MBA program model to determine the generalizability of the findings in another locale and in other circumstances. Finally, further research is needed on the absence of interactions with other students; ways to evaluate learning beyond tests; and follow-up on how these television students perform on the job compared to traditional classroom students.

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Lurker Contributions: Outside Intervention in a Computer-Mediated Distance Education Course

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Introduction

In recent years, the topic of educational restructuring has become the focus of an intense debate both inside and outside of the educational community. A number of factors including an apparent decline in the performance of U.S. students, changing home and family life, changing U.S. demographics, new workplace demands, and new technology developments have conspired to cause us to reflect on the educational enterprise, especially as it is conducted in U.S. public schools. The topic is both large and complex, and educators need to engage in a dialog that explores its many facets. While many factors need to be addressed, technology is often viewed as one key component of restructuring efforts. This paper describes an intersection of educational restructuring and technology. It describes the creation of computer–mediated distance education course for educators on the topic of educational restructuring, and it addresses a very surprising outcome from the delivery of this course.

Education in the United States seems to be in a state of crisis. The litany of problems is long and well familiar both to the education community and the public at large. What can be done? While many factors need to be addressed, there is growing agreement that appropriate use of technology must be an integral part of educational restructuring efforts. Technology has the potential to effect new and better ways of educating our young (Transforming American Education, 1986; Power On!, 1988). Computer-based telecommunications and computer networking offer one avenue for doing education in different and potentially better ways.

In a discussion of technology-mediated interactive learning, Dede (1990) points out that computer-supported cooperative distance learning can transcend barriers of time and space, foster the development of shared mental models, build social interactions, and promote emotional and maturational shifts in students. Cohen and Riel (1989) report that students who write compositions for peer communication over a computer network write better and more complete compositions than students who write for teacher evaluation. Apparently, the genuine social context of writing for peers induces better performance than the incentive of writing for a grade. Levin, Riel, Miyake, & Cohen (1987) also point to the benefits of social and cultural context that accrue from electronic networks. They report that students in different cultural settings learn and solve problems via an apprenticeship model by interacting electronically with other students as well as with teachers and other adults.

Technology mediated interactive learning has the potential for college and adult education as well as for the education of K-12 students. Computer-mediated distance education has been shown to be an effective alternative for college level courses (Hiltz, 1986; Harasim, 1987) and useful for in-service teacher training (Stowitschek, Mangus, & Rule, 1987). The use of technology can reduce teacher isolation and foster communication among the wide group of people involved in education. Given the climate for educational change existing today, the use of telecommunication offers some especially intriguing possibilities. Indeed, Beverly Hunter (1990), formerly of the National Science Foundation, sees a window of opportunity in the simultaneous efforts to engineer a national and international telecommunications infrastructure and to seek new structures for education.

Background

The project described here involved a computer–mediated distance education course on the topic of educational restructuring that was offered through Purdue University's Continuing Education Administration during the spring semester of 1993. The course was created through the collaboration of two professors and a graduate student at Purdue University over a several month period during the fall semester of 1992-93. We were particularly interested in this delivery system and its applicability to college instruction. In addition, it offered a solution to our problem of attracting a diverse group of class participants. The use of a distance education method allowed for the participation from individuals at widely separate geographical locations in the state. Computer-mediated distance education was selected because it is conducive to extended dialog on a topic, it offered flexible scheduling, and because the infrastructure for such a course was already in place. The Indiana Department of Education maintains an electronic mail and computer conferencing system, called IDEAnet, that is available through toll-free dial-up access to all educators and many students in the state.

Advantages and Limitations of Computer-Mediated Distance Education

Computer–mediated distance education is a relatively new form of distance education. In this approach, electronic mail provides communication links between instructors and students and among the students themselves. Electronic file transfer facilitates the exchange of material such as written papers, reports, and the like. Computer conferencing replaces the traditional classroom discussion. The class "discussion" is maintained within a computer conference that participants can access and add to at any time and from any place that is convenient to them. The rigid scheduling and travel demands of the traditional class are eliminated. The result is what Hiltz (1986) has termed a "virtual classroom." Through computer mediation, the important elements of the classroom discussion are maintained and even enhanced. Participants are able to discuss ideas, often in greater depth and in a more egalitarian atmosphere than is common in an actual classroom setting.

The advantages of computer–mediated distance education include that it:

- Eliminates travel time and expense
- Permits flexible scheduling
- Provides convenient (potentially 24 hour per day) access to course materials, other students, and instructors
- Provides learners with access to expert instructors as well as to group knowledge and support
- Enhances opportunities for class interaction
- Provides an egalitarian class atmosphere
- Stores communications for convenient access, reflection, and response
- Provides instruction relatively inexpensively (once the necessary infrastructure is established)

Few educational techniques are appropriate in all circumstances; computer–mediated distance education is no exception. The limitations of this methodology include that it:

- Lacks the visual and verbal cues of face–to–face or video instruction
- Requires computer familiarity and acclimatization to the computer conferencing system for effective participation
- Requires structure to facilitate learning and foster interaction
- Can create information overload and difficulties tracing interchanges because of the sheer volume of information generated
- Is subject to problems including but not limited to computer hardware, computer software, and telephone or network lines

Development of the Course Content

There were three people who were instrumental in the development of this course. Two of us, James Lehman, an associate professor in the Department of Curriculum and Instruction, and William McInerney, an associate professor in the Department of Educational Studies at Purdue University, were already acquainted and shared a common interest through participation in the Electronic School District (ESD) project. We also shared an abiding interest in school restructuring and the uses of technology in education. Each of us had prior experience in using computers and telecommunication with students. The third member of our team, Gerry White, a graduate student in Curriculum and Instruction and a member of the staff of the School of Liberal Arts, had a strong desire to pursue research in the area of computer-mediated distance education.

Each of us brought individual strengths to the collaboration that created the course. Dr. McInerney had done extensive reading on the topic of educational restructuring as it related to administrative functions. Dr. Lehman was familiar with the topic of computer-mediated distance education through his prior work in the ESD project. Mr. White brought an intense interest in the two topics, the time to collect the articles for the reading list, and most importantly, the willingness to do a lot of the legwork for the creation of the course. We agreed to meet to try to cooperate in the creation of a computer-mediated distance education course on the topic of restructuring American schools. This led to a collaborative effort that crossed departmental and academic school boundaries within the university.

During the development of the course, we shared favorite readings on the topic of educational restructuring and discussed curricular materials that were created during a summer institute on the topic offered by the Lafayette (Indiana) School Corporation in cooperation with Purdue University and the Indiana Department of Education. With the assistance of the directors of this institute, we took its content outline and reading list as a starting point for the development of the curriculum for our distance learning class. We were able to obtain the necessary approvals to offer the course relatively easily, because prior approval had been granted for a course associated with the summer institute.

The initial reading list, taken from the summer institute, provided a broad outline of the topic but with few details. After considering much of the extant literature, we narrowed the topics for the course to: an overview of educational reform and restructuring; the issue of choice inside and outside the classroom; evaluation and alternatives to traditional testing; interdisciplinary curriculum, thematic instruction, and other curricular reforms; technology and the role of technology in educational restructuring; influences on educational restructuring; and new directions and the future of educational restructuring. Using these topics as a guide, we concentrated on developing a more current reading list for the course and the methods by which course would be taught.

The reading list from the summer institute was used as a starting point, and, with the addition of references located through a search of the ERIC database through Internet, a bibliography of over 125 articles dealing with the various topics that would be taught in the course was developed. The development of the bibliography and collection of the articles was a continual process that occurred throughout the fall of 1992 up to the week before the course was taught. We also spent time reviewing different sources that could be used as a textbook. In the end, a publication of the National Education Association on the topic of educational restructuring was selected (Barrett, 1991). This text plus selected readings from the bibliography constituted the final reading list for the course.

Development of the Course Methodology

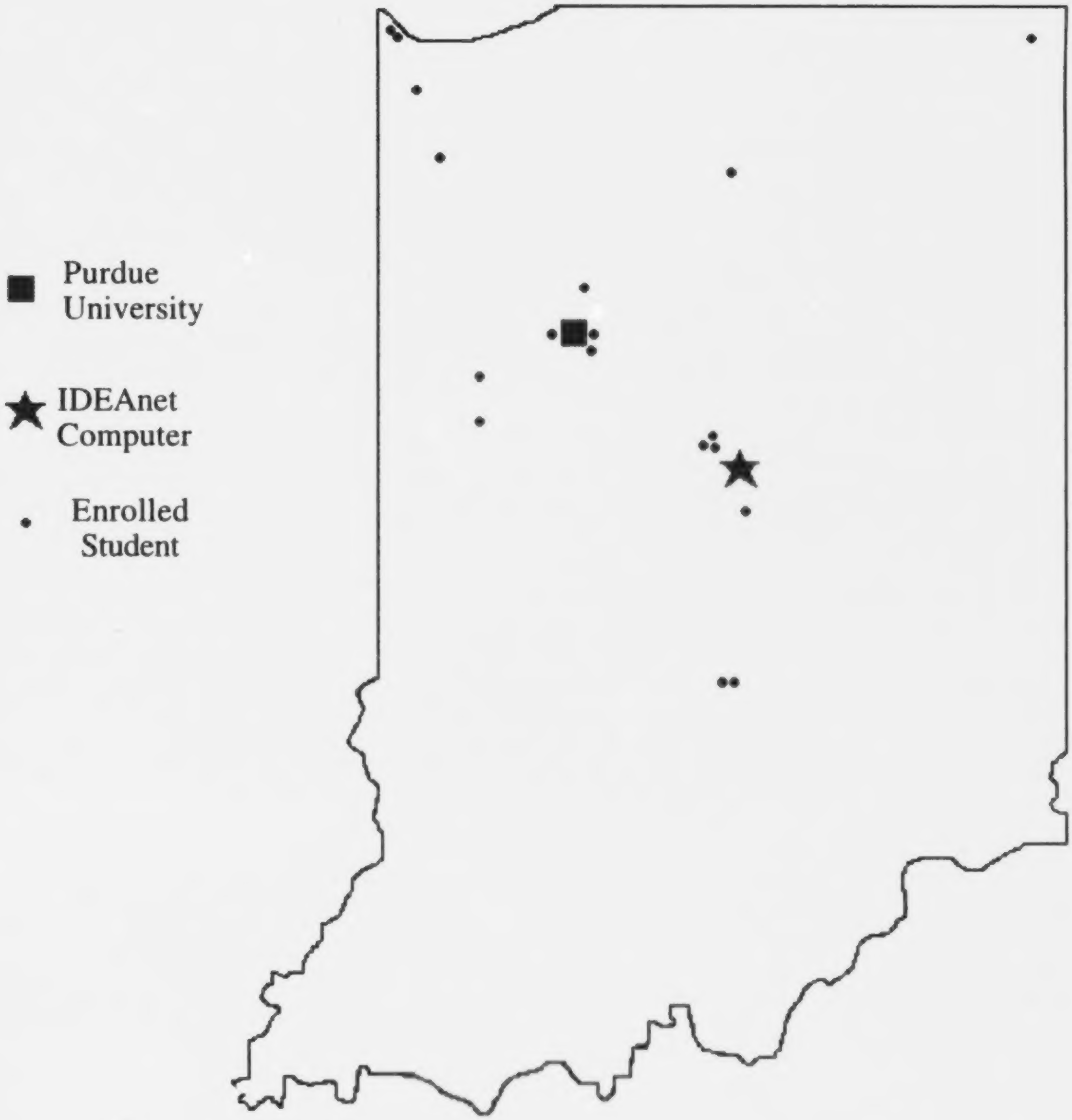
Educational restructuring is a topic that is being widely discussed by those inside and outside of the educational community. Many groups and individuals are stakeholders in the debate about educational reform, and the topic is one that in many ways cries out for extended debate among a broad constituency. It was our hope that the course would attract a diverse group of educators who, for reasons of geography, time, or simply lack of interest in the "typical" university course, might not otherwise participate. For that reason, along with our own interest in the methodology, we decided to make the course available to educators throughout the state of Indiana using distance education methods.

We devoted considerable discussion and planning time to the particulars of the course structure and assignments. We wanted to make the course be as much as possible like a regular classroom experience. Yet, we were also very much aware that computer-mediated distance education is unlike the real classroom in many respects. So, we tried to structure opportunities for dialog and use of the medium to get the best out of this approach. At the outset, we decided that class participation, in the form of regular contribution to the on-line discussion, was essential and therefore would be a key factor in grading. To maintain "real-world" authenticity, we wanted the participants to perform a field-based study of restructuring efforts in an individual school or department and report the results back to the class. We also wanted to encourage participants' collaboration, so we planned a group project that would involve cooperation via long distance. Finally, we decided to have each participant write a final paper in which he or she outlined an action plan for the restructuring of a school or school corporation.

The content was organized into a series of eight, two week blocks by topic, to encourage focused discussion of each topic, coordination of readings and participant contributions. The participants were directed to make at least one contribution to the classroom bulletin board during the discussion of each topic. In order to initiate the discussion for each topic the instructors created a thought statement or discussion starter derived from the readings. This approach is consistent with the recommendations of Quinn, Meham, Levin, & Black (1983) that a computer-mediated course should be structured to take advantage of multiple discussion threads, organization of threads, and encouragement of frequent participant contributions. Organizational schemes which encourage computer interaction and take advantage of group communication potential may lead to increased learning effectiveness and decreased course attrition (Harasim, 1987).

Overt collaboration of the participants was required through a group activity related to the course content. Originally, this activity was to involve group development of lesson plans or instructional materials designed to foster educational restructuring. However, this activity was modified as the course progressed, through the interaction of the participants with the course instructors.

In addition to contributions and the group activity, each participant was required to conduct a field-based investigation related to educational restructuring and to write a final paper on the topic. These activities were intended to force participants to observe an actual school restructuring site on the one hand, and synthesize readings and discussions from the entire



re 1. Geographic Distribution of Course Participants

semester on the other hand. These activities were also modified to some extent as the course progressed.

Course Participants and Procedures

The course was advertised throughout the state via postings on the IDEAnet bulletin board, mailings to school corporations, and announcements in several publications in late 1992. Course registrations were handled by Purdue's Continuing Education Administration. In the end, eighteen individuals officially enrolled in the course. These eighteen individuals represented a diverse group of educators including: a school superintendent, an assistant superintendent, two school principals, four curriculum and/or computer coordinators, eight teachers, a guidance counselor, and a graduate student in education who was a former teacher. They were geographically diverse as well; the participants nearly spanned the entire state of Indiana. Figure 1 shows a map of the state with the locations of participants marked.

An orientation session for the course was held on the first Saturday of the 1993 spring semester. Course participants traveled to the Purdue campus in West Lafayette, Indiana, for this session. All subsequent course activity was conducted on-line. At the orientation session, participants were introduced to the course content and to the computer-mediated distance education methodology, which was new to all of the participants. For those unfamiliar with IDEAnet, about half of the class, the system was demonstrated. IDEAnet, a relatively easy to use menu-driven electronic mail and computer conferencing system, was available to all participants through modem access via toll free telephone lines from anywhere in the state. Course materials provided to each participant included reference materials on the IDEAnet system. However, we emphasized that we were not in a position to provide technical support for the course, and it was our expectation that participants would have at least minimal competence in computer telecommunication. Technical problems proved to be a significant difficulty for only a few of the participants.

The course itself was established as a conference area on the IDEAnet computer system with the assistance of Mike Huffman of the Indiana Department of Education, the IDEAnet system administrator. One of the instructors served as conference moderator (topic sysop). For simplicity, we decided to have a single conference area for all public course postings. During the semester, over 300 postings were made to this conference area. This was the class "discussion." Electronic mail (e-mail) was used for private student-to-student, student-to-instructor, and instructor-to-student communication. Electronic file transmission was used for the submission of class assignments, although many participants fell back on regular postal mail or Federal Express either because of a lack of comfort with file uploads and downloads or problems with system operations.

Outcomes and Dynamics of Course Collaborations

It became clear early on in the course that the computer-mediated distance learning methodology worked very well for most of the participants. As has been observed by other researchers in the field (Harasim, 1987; Hiltz, 1990), this methodology can lead to an active, involved kind of learning experience that is at once like and unlike actual classroom dialog. One participant posted a comment to the class conference which captured this flavor eloquently. He stated,

> "I think that somehow we have succeeded in reproducing over keyboards, monitors and telephone lines the 'atmosphere' of an actual classroom discussion. I say this primarily because of my feeling of awe at the discussion taking place. It 'feels' as though I am sitting in a classroom as a wealth of thoughts and ideas flows around the participants like a cleansing stream, sometimes peaceful and soothing, other times swift and cutting, eroding away the sediment of settled routine."

Several aspects of the course led it to develop a fluid, dynamic character. First, the students were diverse beyond those found in typical courses. It was a graduate course populated by professional educators. As noted above, the eighteen people officially signed up for the course included school system and building administrators, teachers, curriculum and/or computer coordinators, and others. Second, the subject matter of educational restructuring is inherently open-ended. We had developed various topics which could be subsumed under the general rubric of restructuring, including choice, alternative assessment, curricular reforms, and the role of technology. However, the discussion did not stay limited to these topics. For example, the topic of choice raised the issue of academic tracking, which we had not intended to feature in the readings or discussions. The participants were intensely interested in it, however, and that issue became a topic that persisted throughout the course.

We as instructors did not interact with the class to the extent we would have had the course been a traditional, face-to-face classroom experience. In retrospect that was due, at least in part, to the team teaching aspect of the course. None of us wanted to shape the discussion without conferring with one another. Further, we believed that when the teacher expresses an opinion on a topic, it tends to cut off discussion on that topic. So, for both reasons, we took a low profile, with few postings other than the biweekly discussion starters for the next segment of readings.

This led to some good news and to some bad news. Because we were not holding a tight rein on the discussion, some topics opened up that otherwise probably would not have. The intense interest in tracking is an example. On the other hand, we got into some discussions that strayed pretty far afield of the presumed course content. A point about the need to be sensitive to the degree of reform that a community can tolerate, for example, led to a lengthy discussion of the informal power structures in various settings (rural, urban, etc.). It might have been useful for one of the instructors to come in and direct that thread back to the issue of community tolerance for reform.

The decision was made to rely for structure on the bi-weekly discussion starters and to allow students considerable range in deciding what they wanted to say. Figure 2 shows the frequency of postings to the course conference broken down by bi-weekly time block. This figure shows that the conference posting grew consistently early in the course, but then tapered off. Early growth was spurred by the participants' growing comfort and familiarity with the IDEAnet interface and by their natural interest in the topic of educational restructuring. Early on, a number of the participants spewed forth a considerable volume of postings, airing opinions on many facets of the educational restructuring debate. Later, as their ardor cooled, postings waned and we saw a need for imposing more structure.

In the post-class evaluation, one student commented that the instructors had "given a basic structure and organization without attaching lots of strings." This student further commented, the instructors "gave us professional and intellectual freedom." Another, however, noted, "I would have liked to see a little more involvement on the part of the instructors. Sometimes discussion seemed to stray from the topic. In a traditional class, the instructor(s) would probably have redirected it. I think that should have been done in this format, also." This participant's comment is consistent with Harasim's (1987) observation that there is a need in computer-mediated distance education to manage and focus the discussion to avoid comments that fail to build on and relate to one another. Finding the effective balance between freedom and structure remains a challenge of this medium.

Figure 2. Frequency of Postings to the Course Conference by Period

E-mail correspondence was regularly exchanged between instructors and participants to address questions or for private comments. In addition, two-thirds of the way into the course, each instructor sent a personal e-mail message to class members (each instructor took half), commenting on some of the points that the students had raised in their postings. The intent of this was to let each student know that he or she was valued individually, and that his or her points were being noticed. It was also hoped that these messages would boost the sagging frequency of postings to the conference. Student reaction to these messages was quite positive, often oriented to what the student felt he or she had gotten out of the course. As an example, one student replied:

> "Thanks for your comments, I have really enjoyed this class. My reason for taking it was for continuing ed. credit. It has been a great way for me to satisfy this requirement and keep up with my job as well. I have also used many of the concepts in discussions with my high school principal. As a result, I am confident that we will be doing some restructuring next year and in the future."

The dynamic nature of the course also resulted from the fact that the delivery system, IDEAnet, is a public conferencing system open to any person in the state with a computer and a modem. We purposely made no attempt to restrict access to our course conference. The system operator for IDEAnet reported that nearly 200 people were signed up for the conference in which the course activities were carried out. Ten of these people reading the conference (but not members of the class) posted comments to the conference. The students seemed pleased to have this additional participation in their conference. In addition, several of the "guest" or "lurker" comments were important in shaping the discussion of the class members.

Finally, we found our activities as instructors being shaped by the developing nature of the discussions. We attempted to provide some structure by posting discussion starters every two weeks as the students got into a new section of readings. While these discussion starters were evident in the postings to the conference, students felt free (as did guests) to shape the discussions according to their own interests as well. Originally, we had intended that the group project would be the development of curricular materials. When it came time to assign the groups, however, we realized that there was still

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considerable ambiguity in what the students meant by the term "restructuring." Many ideas and points of view had been expressed, and not much resolution had occurred.

Consequently, we changed the group assignment to a description of "a day in the life" of a restructured school, hoping that in working on this assignment some resolution and synthesis of the ideas would occur. We deliberately set up the groups to include people with varying positions in education and people geographically dispersed. A strength of computer-mediated distance education is the egalitarian nature of the postings (a teacher's posting looks just like that of a superintendent) and the ability to link people who would rarely if ever meet because of the geographic distances separating them.

The Effect of Lurker Contributions

One of the most fascinating outcomes of this project was almost entirely unexpected. We did not anticipate the effect of lurker contributions to the discussion by the class. First, a little background is necessary. The wide-area network that was used for this project, IDEAnet, is a public bulletin board. Although there were ways to limit access to the discussion to the class participants, we decided to leave it open to all of the users of IDEAnet so that they could monitor the progress of the course and it's outcomes. Individuals that look in on bulletin boards, computer conferences, and listservers are frequently referred to as "lurkers" or "guests" by people that are familiar with electronic networks. Typically the lurker simply follows the discussion without making any contributions to the discussion itself. What we did not anticipate when we created this course was that some people that were monitoring the discussion would feel compelled to make contributions to the class discussion. The contributions of these lurkers to the course profoundly affected the discussion.

As noted above, the system operator for IDEAnet reported that nearly 200 people were signed up for the conference in which the course activities were carried out. Ten of these people reading the material from the course, but not members of the class, posted comments to the conference. These Lurkers will be labeled lurker A, Lurker B, Lurker C,..., Lurker J for the remainder of the discussion. The registered students in the course seemed pleased to have this additional participation in their conference. In addition, several of the "lurker" comments were important in shaping the discussion of the class members. A total of 25 (8.2%) postings were made by lurkers to the course discussion out of a total of 306 postings. All but one of the postings were from people that were characterized as either administrators or teachers within education. The exception was a gentleman who worked at a factory as a purchasing manager who was taking another course at Purdue and had heard about the on-line course from the class he was taking. One lurker made six (6) postings to the conference, another made five (5) postings, two lurkers made three (3) postings, two lurkers made two (2) postings, and four lurkers made one (1) posting to the conference. Lurker contributions began during the second two-week unit of the course and came regularly after that.

The first lurker, Lurker A, was the technology coordinator of a mid-sized school corporation. His initial posting (comment 65) was an offering to provide additional information about Tech Prep as it applied to restructuring. Tech Prep is an initiative of the Indiana Department of Education "encouraging high standards of learning through a "hands on" approach where real world situations are integrated into the curriculum. Lurker A was responding to the comments from two class participants that mentioned Tech Prep in previous postings (comments 46 and 51). The discussion of Tech Prep struck a chord with two of the class participants, because it led them to describe in detail the aims and goals of Tech Prep for their field reports as it applied to schools (comments 172 and 202). The field report was one of the assignments for the students registered in the course. Tech Prep continued to be a popularly referred to program. It was mentioned by two other class participants in comments 210 and 213. The next posting by Lurker A (comment 214) was in response to a cost figure given by a class participant for the cost of the Tech Prep program. He argued in this posting that the figure seemed to be too high. This led to one of the class participants referring to Tech Prep as a fad in comment 233. No other citations of the Tech Prep program occurred until the final comment from Lurker A. This final comment was an announcement of two courses to be offered by Ball State University (another Indiana institution) that would lead to certification in the Tech Prep curriculum.

Lurker B was a teacher from a rural school district and his comment was addressed specifically to a class participant that had denigrated restructuring efforts as merely "lip-service." His posting (comment 117) argued that real reform was not occurring in the current restructuring efforts, and that only surface changes were occurring within the restructuring context. The original comment suggested completely dismantling the current educational system and starting from "scratch." Lurker B responded to this posting by arguing that not everything needed to be changed, or restructured, in education because there were many "good things' happening in schools all around the country. There were no responses to the contribution of Lurker B by anyone else in the class.

Lurker C was a prolific participant to the course as evidenced by the fact that he contributed a total of six postings to the discussion. The initial posting (comment 143) was to describe the work of Lester Thurow in the area of education. The next four times (comments 239, 246, 247, and 253) that Lurker C posted to the course were in reference to the Buddy Project, a joint initiative in Indiana between the Indiana Department of Education, local school corporations, and businesses to provide a computer equipped with a modem to every fourth and fifth grade student in the State of Indiana. In addition to the three postings by Lurker C, there were three requests (comments 241, 251 and 255) for more information about the Buddy Project from two registered class participants, and an additional posting of information about the program from yet another lurker, Lurker I (Comment 256). The final comment (comment 296) that was made by Lurker C was in reference to the posting of one of the group projects by the class participants. The registered students in the course were instructed to describe a "day in the life" of a restructured school. Lurker C was interested in the fact that this group project described the restructured school within the context of larger "growing environments." He argued that this group project recognized that learning can, and does, occur outside of the school environment. This was one of the final postings to the conference (296 of 306), so there was little opportunity for the class participants to respond, and none did.

The next lurker, Lurker D, made five contributions to the course. This lurker was the representative from the local factory mentioned above. His initial posting (comment 151) dealt with the concept of applying business models to the restructuring efforts in education. He also argued for treating the students, and their parents, as customers as the restructuring vision is developed. This posting generated two comments from two different class participants. One of the registered class participants argued that Lurker D had made positive suggestions (in comment 153) but that educators cannot treat the child in the school classroom as a customer the same way that you can in a retail establishment. The second person argued that if we are to restructure education that the product has to be palatable to the marketplace (comment 154). This participant argued that rather than initially focus on the process of restructuring, a better definition was need of the end product. The next two comments from Lurker D dealt with the issue of funding educational reform (comment 175 and 240). He believed that there was not enough commitment from either the state legislature or from industry in the state of Indiana for education, much less for restructuring efforts. He cited an example of how the Peoria Illinois schools budgeted for three years to achieve the restructuring goals that they had set. He also argued that there are other school corporations that are involved in restructuring that have followed quality control models from business. The final two postings from Lurker D (comments 267 and 268) were in reference to the use of Total Quality Management (TQM) techniques in restructuring education. Specifically, this lurker offered to show a videotape of several TQM success stories at the George Westinghouse Vocational and Technical High School in New York City.

The next lurker, Lurker E, was an administrator from the state Department of Education. His initial posting (comment 157) was in response to an off-hand comment from one of the class participants about placing telephones in every classroom in every school in the state. He cited the state of Washington as beginning such an initiative in order to build a telecommunications infrastructure for the transmission of data as well as facilitating communication between teachers and parents. This led to a response from four of the registered class participants, in comments 169, 172, 178, and 181. In each of these postings the class participant noted that telephones would be a valuable additional resource that would be welcomed in the classroom. Two course participants noted the frustrations, and costs, in trying to make arrangements to get telephones in their classrooms. A final comment regarding the use of telephones came from Lurker F in comment 159. This lurker described a school that had succeeded in getting telephones placed in all of the classrooms in his school that could demonstrate a need for the telephones. Lurker E also contributed to the discussion in comment 230 by arguing that educational administrators should stop looking at computers and other forms of technology as capital outlays and instead should look at them as "workbooks" necessary for daily teaching and curricular activities. This led to a couple of responses from the class participants about the need to saturate the schools with technology. In the same reasoning, it led to a discussion of the need for computer labs in restructured schools. Many felt that computer labs would become unnecessary in restructured schools because computers would become the focal delivery point of learning. Unfortunately, this would also involve every teacher embracing the technology as more than a glorified typewriter with a spell-checker. This was viewed as a daunting task by the class participants. The final comment by Lurker E was a housekeeping problem regarding uploading/downloading comments to IDEAnet.

One of the most interesting contributions came from Lurker G in comment 218. This was the only contribution by this individual, but his comments had the most profound effect of all of the lurkers. Lurker G was an administrator who had been observing the discussion that had emerged on the subject of tracking. Not being satisfied with the way the discussion had turned in the class on this subject, and finding that the discussion of the issue had seemingly died, he offered a 20-screen essay on the issue of expectations for low-achieving students. It was his position that:

> "It may not make as much difference as we think what groups we place students in SO LONG AS THE ATTITUDE TOWARD ACHIEVEMENT IS POSITIVE, AND SO LONG AS EXPECTATIONS ARE HIGH. What I would ask of this group is, how demanding is the program for low-ability kids? Have we given them clear tasks in suitable quantity to challenge them? Have we given them a real opportunity to succeed, or have we structured programs with an expectation that they will fail? Is the problem the grouping or the expectation?"

This guest went on to say that perhaps school could be changed a great deal, with other forms of grouping considered that cross traditional district lines. Specifically, distance education technologies could permit several schools and/or districts jointly to offer a course which none singly had the full enrollment. This comment led to two other comments from class participants. This in and of itself wasn't as significant as the fact that many of this lurkers ideas and proposals showed up in the "day in the life of a restructured school" group projects.

Lurker H made two contributions to the class discussion. His first posting, comment 229, was a brief description of the status of a bill that was before the Indiana legislature regarding the use of capital project funds (CPF) for the purchase of computer equipment. He also gave his interpretation of the legality of using CPF to lease computer equipment. This posting was in response to a question from one of the class participants about the feasibility of leasing vs. purchasing computer equipment for schools in comment

228. The other contribution from Lurker H was in regards to the Buddy Project mentioned previously.

The final lurker contributions came from Lurker J near the end of the course, in comments 281 and 282. Comment 281 was a statement regarding the delivery methodology of this course. He noted that:

> I have been peeking in your on-line course over the past few weeks. It's very interesting to see outstanding educators such as yourselves converse via modem. Personalities actually begin to appear although no faces are attached. The comments raised relating to school restructuring make me realize we are not alone, yet in our schools we tend to face the same barriers across the state. Keep up the good dialogue and best wishes in your endeavors on making our schools the best they can possibly be!

The final comment from Lurker J was an offer to assist a member of the course in downloading files from IDEAnet.

Conclusions

Computer-mediated distance education courses are being offered increasingly frequently as more of the population becomes connected to both local area networks and wide area networks. Access to these networks and the features associated with the networks are increasingly available for public access. Many courses/classes have in the past tried to limit participation in their course discussion to just the participants enrolled in the course. Although the potential exists for lurkers to create problem in an on-line course, our contention is that the presence of individuals who are not regular, registered members of the course can have a profound and positive effect on the communication that occurs in a course.

Our findings were that the contributions of guests to this course were invaluable. We felt that the richness of the discussion would have suffered significantly, if not for these lurker contributions to the learning environment for the members of this particular course. We suggest that if a computer-mediated distance education course is offered over a public bulletin board system such as we used, that lurker contributions be actively sought and even arranged. Some possibilities exist for the inclusion of subject matter experts to enter the class discussion at appropriate times or the creation of postings by "ghost lurkers", actually the instructor under a pseudonym, to portray a devil's advocate to alter or enhance the discussion. Other possibilities, of course, can be envisioned for the use of lurkers in computer-mediated distance education courses.

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